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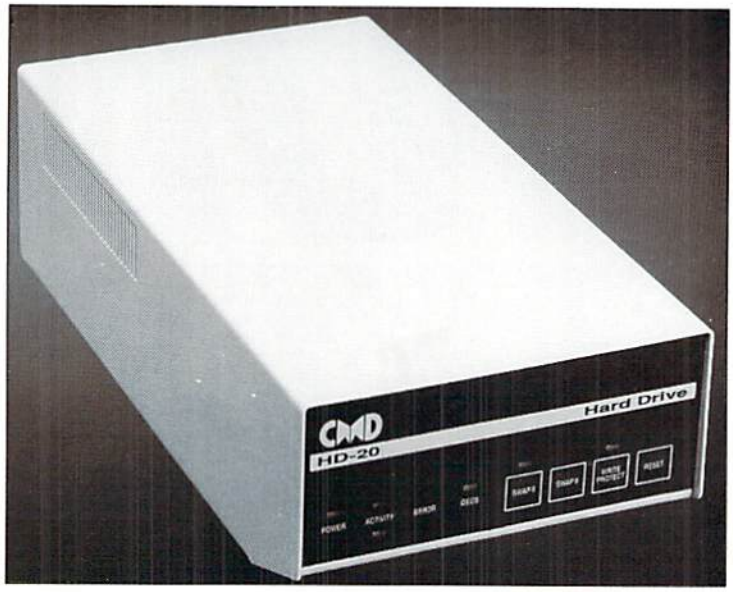

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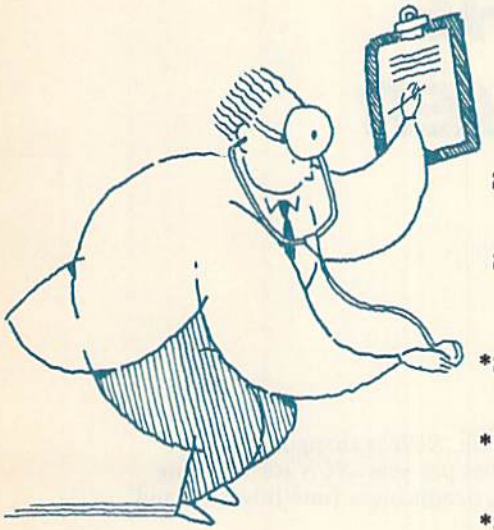

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COVER PHOTOGRAPHED BY ED JUDICE

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LETTER FROM THE PUBLISHER

Dear *RUN* Readers,

Beginning with this June/July issue, *RUN* is changing its frequency from monthly to ten times per year. *RUN* is combining issues during the summer months, producing a June/July issue and an August/September issue.

Several factors, including a change in the way advertisers place their ads throughout the year, have contributed to this decision. Although we know that this step will not be a popular one among our readers, this change of frequency does allow us to cover the Commodore 8-bit market effectively. While it's troubling to see a once robust industry reduced to just a handful of advertisers, we realize that it makes our job and our pledge to the market even that much more important.

As part of this frequency change, *RUN* will, of course, adjust the expiration date of all subscriptions and deliver the total number of issues each subscriber ordered and paid for.

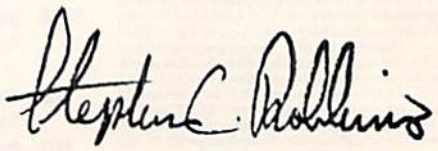
Readers would be incorrect to interpret this frequency change as a weakening of our resolve for the market. We are more determined than ever to continue our support for our readership of C-64/128 users. We know that there is much activity among Commodore users—in the users' groups, online and in the hundreds of thousands of Commodore homes across North America.

You will notice that this issue features a pullout card of useful programming commands that you can keep as a handy reference for your computing needs. This bonus feature reflects our willingness to meet the needs of our readers through the pages of *RUN*.

While other manufacturers have discontinued their support for this market, *RUN* is proud to continue its commitment to its readership. In upcoming issues, *RUN* will be covering many exciting new developments—new hardware and software that will bring your Commodore computer into the 90s in style.

We look forward to it and hope you do too!

Regards,



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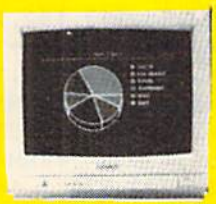

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MAGIC

A numeric keypad for the C-64; marquee messages; and banners of different heights.

By TIM WALSH

$597 CLEAN SWEEP 64

Super Sweep 64 "sweeps" the screen clear in a variety of ways, and you can experiment with them. The syntax for activating Super Sweep 64 is as follows:

```
SYS 49152,S,T
```

where S is a number from 0 to 255 and determines the speed of the clearing process (the lower the number, the faster the clear). T is 0, 1 or 2 and specifies the type of clear. For instance, setting T equal to 0 will clear upwards and towards the center of the screen simultaneously, while 1 will sweep towards the center and 2 will sweep to the center and return to the line where the command originated. Clean Sweep 64 can easily be used within programs for dynamic effects, and it's fully relocatable.

```
Ø REM CLEAN SWEEP 64 - REINER RICHTER
                                        :REM*132
1Ø FOR T= 49152 TO 49399:READ D:POKE T,D:C
   K=CK+D:NEXT                          :REM*228
2Ø IF CK <> 28864 THEN PRINT "ERROR IN DAT
   A...":END                            :REM*7Ø
3Ø B=49152:C=256:B=B+35:POKE B+192,B-INT(B
   /C)*C:POKE B+193,B/C                 :REM*127
4Ø PRINT"ENTER SYS 49152,S,D TO CLEAR SCRE
   EN."                                 :REM*89
5Ø DATA 32,241,183,232,134,2,32,241,183,13
   4,7,56,32,24Ø,255,138,72,152,72:REM*167
6Ø DATA 162,25,169,19,32,21Ø,255,169,17,2Ø
   2,2Ø8,248,169,2Ø,133,12,166,2        :REM*163
7Ø DATA 136,2Ø8,253,2Ø2,2Ø8,25Ø,169,255,13
   3,3Ø,133,32,169,215,133,31,169       :REM*52
8Ø DATA 3,133,33,162,231,16Ø,19,177,32,72,
   177,3Ø,2ØØ,145,3Ø,1Ø4,145,32         :REM*199
9Ø DATA 136,136,2Ø8,241,169,4Ø,24,1Ø1,3Ø,1
   33,3Ø,169,4Ø,24,1Ø1,32,133,32        :REM*175
1ØØ DATA 144,4,23Ø,31,23Ø,33,228,32,2Ø8,21
    5,169,7,197,33,2Ø8,2Ø9,169,2Ø       :REM*26
11Ø DATA 133,3Ø,133,32,169,4,133,33,169,21
    6,133,31,162,252,16Ø,1,177,32       :REM*1Ø9
12Ø DATA 72,177,3Ø,136,145,3Ø,1Ø4,145,32,2
    ØØ,2ØØ,192,2Ø,2Ø8,239,169,4Ø        :REM*178
13Ø DATA 24,1Ø1,3Ø,133,3Ø,169,4Ø,24,1Ø1,32
    ,133,32,144,4,23Ø,31,23Ø,33         :REM*54
14Ø DATA 228,32,2Ø8,213,169,7,197,33,2Ø8,2
    Ø7,169,3,133,33,169,255,133,32      :REM*41
15Ø DATA 162,15,169,32,16Ø,Ø,145,32,2ØØ,14
    5,32,169,4Ø,24,1Ø1,32,133,32        :REM*225
16Ø DATA 144,2,23Ø,33,228,32,2Ø8,232,169,8
    ,197,33,2Ø8,226,169,1,37,7,2Ø8:REM*115
17Ø DATA 5,169,17,32,21Ø,255,198,12,24Ø,3,
    76,Ø,Ø,169,2,37,7,2Ø8,5,1Ø4          :REM*225
18Ø DATA 1Ø4,76,68,229,24,1Ø4,168,1Ø4,17Ø,
    76,24Ø,255                           :REM*43
```

—REINER RICHTER, KALLISTA, AUSTRALIA

$598 64 NUMERIC KEYPAD

All those who've endured the agony of typing in C-64 programs made up of seemingly endless Data statements probably have longed for a numeric keypad. Well, your wait is over! 64 Numeric Keypad is a keypad program packed with useful options.

Type in and save 64 Numeric Keypad to disk. To activate it, press the control and F1 keys at the same time. It converts the U, I and O keys to 4, 5 and 6, respectively; the J, K and L keys become 1, 2 and 3; and the M key is 0. The 7, 8 and 9 keys perform as usual. For added convenience, the 0 key is now the insert-delete key, and P is the minus key. The colon key becomes the return key.

All other keys are deactivated, except for the D key and shifted A, so that the word DATA can be abbreviated when typing in Data statements. You can deactivate 64 Numeric Keypad the same way you activated it—just press control/F1.

```
Ø REM 64 NUMERIC KEYPAD - IVAN KRALJEVIC
                                        :REM*118
1Ø FOR T=49152 TO 49342:READ D:POKE T,D:CK
   =CK+D:NEXT                           :REM*2
2Ø IF CK<>25665 THEN PRINT"DATA ERROR":END
                                        :REM*86
3Ø SYS 49152                            :REM*2Ø4
4Ø DATA 12Ø,169,18,141,143,2,169,192,141,1
   44,2,169,Ø,141,125,192,88,96         :REM*188
5Ø DATA 173,141,2,2Ø1,3,2Ø8,21,2Ø5,142,2,2
   4Ø,52,173,145,2,48,77,173,24         :REM*211
6Ø DATA 2Ø8,73,2,141,24,2Ø8,76,112,192,2Ø1
   ,4,144,35,164,2Ø3,192,4,2Ø8          :REM*173
7Ø DATA 29,2Ø5,142,2,2Ø8,4,196,197,24Ø,17,
   173,125,192,24Ø,2,169,255,73         :REM*85
8Ø DATA 255,141,125,192,162,255,76,38,235,
   76,66,235,1Ø,2Ø1,8,144,2,169         :REM*75
9Ø DATA 6,17Ø,2Ø8,7,173,125,192,24Ø,2,162,
   8,189,115,192,133,245,189,116        :REM*64
1ØØ DATA 192,133,246,76,224,234,129,235,19
    4,235,3,236,12Ø,236,126,192,Ø       :REM*155
11Ø DATA 2Ø,13,29,255,255,255,255,17,255,2
    55,255,255,255,255,69,1,255         :REM*1Ø7
12Ø DATA 255,68,255,255,255,255,255,55,255
    ,255,56,255,255,52,255,57,53        :REM*192
13Ø DATA 49,2Ø,48,5Ø,54,255,43,45,51,45,46
    ,13,255,44,255,42,59,255,1,61       :REM*29
```

```
14Ø DATA 94,47,255,255,4,255,32,2,255,3,25
    5                                  :REM*235
```

—IVAN KRALJEVIC HARFORD
COCHABAMBA, BOLIVIA

$599 MINI MARQUEE 64

Many routines have been written that make a message scroll across the C-64 screen. What sets my short machine language program, Mini Marquee 64, apart from other message-scrolling routines is that up to 175 characters move across the screen in a pixel-by-pixel format, resulting in a super-smooth, professional display.

To use it in your own programs, delete lines 70–90 and substitute your own program between lines 60 and 1999. To activate, use the commands M$="YOUR MESSAGE" and L=line#, which is the physical screen line for the marquee to scroll across.

```
Ø REM MINI MARQUEE 64 - RICHARD PENN
                                       :REM*38
1Ø FOR U=679 TO 744:READ Q:POKE U,Q:CK=CK+
   Q:NEXT:FORT=1TO4Ø:B$=B$+" ":NEXT:REM*9Ø
2Ø IF CK <> 1Ø433 THEN PRINT"ERROR IN DATA
   ...":END                            :REM*2Ø1
3Ø DATA 12Ø,162,192,134,252,169,Ø,133,251,
   16Ø,199,173,18,2Ø8,2Ø1,5Ø,2Ø8,249
                                       :REM*252
4Ø DATA 14Ø,22,2Ø8,173,18,2Ø8,2Ø1,58,2Ø8,2
   49,142,22,2Ø8,136,192,191,2Ø8,231
                                       :REM*31
5Ø DATA 173,1,22Ø,2Ø1,239,24Ø,21,16Ø,4Ø,17
   7,251,153,255,3,136,2Ø8,248,23Ø:REM*135
6Ø DATA 251,165,251,2Ø1,69,2Ø8,2Ø4,76,172,
   2,88,96                             :REM*242
7Ø M$="INTRODUCING MINI MARQUEE! A SHORT M
   L ROUTINE FOR SCROLLING"            :REM*7
8Ø M$=M$+" MESSAGES SMOOTHLY ACROSS THE SC
   REEN...PRESS SPACEBAR TO QUIT..."
                                       :REM*14Ø
9Ø PRINTCHR$(147)CHR$(154):POKE 53281,Ø:PO
   KE 5328Ø,Ø:L=1Ø:GOSUB 2ØØØ:END      :REM*21Ø
1999 REM DISPLAY MARQUEE SUB            :REM*27
2ØØØ M$=B$+M$+B$:POKE 2Ø9,Ø:POKE 21Ø,192:P
     OKE 211,Ø:POKE 213,LEN(M$):PRINTM$
                                       :REM*23Ø
2Ø1Ø C=55296+L*4Ø:FORT=CTOC+39:POKE T,PEEK
     (646):NEXT                        :REM*25
2Ø2Ø S=C-54273:H=INT(S/256):POKE727,S-H*25
     6:POKE 728,H                      :REM*1Ø3
2Ø3Ø POKE 694,5Ø+8*L:POKE 7Ø4,PEEK(694)+9:
     POKE 737,LEN(M$)-4Ø:SYS679:RETURN
                                       :REM*1Ø2
```

—RICHARD PENN, MONTREAL, QUEBEC, CANADA

$59A ADD A DRIVE 64/128

Add a Drive 64/128 is an invaluable disk utility that lets you switch a disk drive's device number from 8 to 9. Because this change is performed via software, you can furnish your system with two drives that are not equipped with DIP switches, such as older 1541s, and configure one as device 8 and the other as device 9. Just keep a copy of Add a Drive 64/128 on a disk and run it when needed.

```
Ø REM ADD A DRIVE 64/128 - JERRY DICKSON
                                       :REM*2Ø6
1Ø PRINTCHR$(147)"TURN OFF FIRST DRIVE, TU
   RN":PRINT"ON SECOND DRIVE."         :REM*167
2Ø GETA$:IFA$=""THEN2Ø                 :REM*212
3Ø OPEN15,8,15                         :REM*138
4Ø PRINT#15,"M-W"CHR$(119)CHR$(Ø)CHR$(2)CH
   R$(41)CHR$(73):CLOSE15              :REM*148
5Ø PRINT"{CTRL 8}NOW TURN ON FIRST DRIVE."
   :END                                :REM*216
```

—JERRY DICKSON, SANDWICH, IL

$59B BANNER 64

Banner 64 prints banners in eight different heights, using any character or graphics symbol. At the first prompt, enter your message, and at the second enter the height of the message, from 1 to 8.

Banner 64 works with virtually any printer and can be used with custom character sets that are stored beginning at location 12288.

```
Ø REM BANNER 64 - JAY TAPLIN          :REM*225
1Ø OPEN4,4:PRINT#4,CHR$(27);CHR$(86);CHR$(
   14):IF(PEEK(251)AND255)=99THEN5Ø
                                       :REM*182
2Ø POKE52,48:POKE56,48:POKE56334,PEEK(5633
   4)AND254:POKE1,PEEK(1)AND251        :REM*2Ø1
3Ø FORI=ØTO2Ø4Ø:POKE12288+I,PEEK(I+53248):
   NEXT:POKE1,PEEK(1)OR4               :REM*73
4Ø POKE56334,PEEK(56334)OR1:POKE251,99
                                       :REM*162
5Ø INPUT"MESSAGE";W$:INPUT"HEIGHT";H:R$="{
   CTRL 9}{1Ø SPACEs}{CTRL Ø}":I$="{1Ø SPA
   CEs}":SL=12288                      :REM*197
6Ø FORW=1TOLEN(W$):PRINT"{SHFT CLR}"MID$(W
   $,W,1):X=PEEK(1Ø24)AND255:X=X*8     :REM*43
7Ø FORT=7TOØSTEP-1:Z=(2{UP ARROW}T):FORQ=1
   TOH:FORJ=7TOØSTEP-1                 :REM*25Ø
8Ø IF(PEEK(SL+X+J)ANDZ)=ZTHENO=Ø:FORN=1TOH
   :PRINT#4,"{CTRL 9} {CTRL Ø}";:NEXTN:GOT
   O1ØØ                                :REM*84
9Ø FORN=1TOH:PRINT#4," ";:NEXTN        :REM*158
1ØØ NEXTJ:PRINT#4,CHR$(141):NEXTQ,T:PRINT#
    4,CHR$(141):NEXTW                  :REM*175
11Ø INPUT"ANOTHER BANNER";A$:IFLEFT$(A$,1)
    ="Y"THENGOTO5Ø                     :REM*247
12Ø CLOSE4:END                         :REM*42
```

—JAY TAPLIN, HAMPDEN, ME ■

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NEWS AND NEW PRODUCTS

Give your computer system the protection it deserves, and consult a catalog of hundreds of C-64 and C-128 programs.

By HAROLD R. BJORNSEN

PROTECT YOUR COMPUTER SYSTEM

JAFFREY, NH—Curtis Manufacturing Co., Inc. (30 Fitzgerald Drive, Jaffrey, NH 03452) introduces four new products for Commodore computers.

Clean Drive is a drive cleaning disk for both 5¼- and 3½-inch drives and includes 15 single-application head cleaning solution packets to remove dust and help prevent read/write errors. $9.95.

Eight wet towels, eight dry towels and a reusable towel packaged in **Clean Screen** help prevent static discharge from monitors, mesh glare filters and keyboards. $5.95.

Clean Mouse comes with a mouse "scrubbing board," two scrubbing balls, mouse cleaning solution and a lint-free cloth to help extend mouse life. $14.95.

The **Universal Security Kit** provides protection against theft and misuse of your computer and up to three peripherals. $19.95.

Check Reader Service number 400.

WHAT'S ON THE MENU?

PITTSBURGH—***Software Information for Commodore Computers*** contains descriptions of over 5000 software programs for, as the title indicates, Commodore computers. There are 250 pages devoted to the C-64 and C-128. Software categories covered are productivity, education, industries, personal, entertainment, sciences, professions/services and systems.

Each description includes system requirements, price and company to order from. The large-format, 438-page catalog, which is updated twice a year, retails for $12.95 and is available from MENU Publishing, PO Box MENU, Pittsburgh, PA 15241.

Check Reader Service number 403.

HI-RES PRINTER

NEW YORK—Star Micronics (200 Park Ave., Suite 3510, New York, NY 10166) has released the **NX-2410 Multi-Font**, a 24-wire dot matrix printer.

For graphics applications, the Star Micronics NX-2410 dot matrix printer provides 360-by-360 dpi resolution.

It offers letter-quality output and advanced paper handling, prints between 60 and 180 cps and has four internal fonts. The desktop unit can be used for business correspondence, word processing, desktop publishing and computer-aided design applications. $499.

Check Reader Service number 401.

UH-OH

YORKTOWN HEIGHTS, NY—A computer model for studying the brain has unexpectedly, and on its own, produced electrical waves like those actually found in the brain itself. The unique, supercomputer-based model generated this surprising result in tests conducted recently by its developers at IBM.

The computer model was designed to imitate 10,000 cells in the brain's hippocampus, an area that's essential for the formation of new memories and is also the origin of many epileptic episodes.

Using the model, scientists can simulate how the hippocampus works and study the medical benefits an increased understanding of epilepsy can bring. This study might also suggest new ways for designing tomorrow's computers.

CHEATING'S OKAY HERE

PITTSBURGH—Cheatsheet Products (PO Box 8369, Pittsburgh, PA 15218) introduces two new **Leroy's Cheatsheets** (keyboard overlays) for users of the C-64 integrated word processors Fleet System 2+ (PSI) and Word Writer 4 (Timeworks).

Two C-128 Leroy's Cheatsheets are for users of Berkeley Softworks' GEOS 2.0 and Batteries Included's integrated word processor, PaperClip III (distributed by Electronic Arts).

The cheatsheets let you condense all of these programs' key commands to a single reference card that fits on your keyboard and puts important keyboard information at your fingertips. The C-64 overlays are available at $3.95 each; the C-128 overlays at $7.95 each.

Check Reader Service number 404.

LIVING IN STYLE

JERSEY CITY, NJ—**Space Center**, a home-office work center from Soundesign (Harborside Financial Center, 400 Plaza Two, Jersey City, NJ 07311) offers work surface and storage options in one modular design. The four-piece computer workstation (model WS4001K) consists of a desk, hutch, printer stand and corner adaptor. The unassembled furniture is $129.95.

Check Reader Service number 405.

MONEY, MONEY

ROCKVILLE, MD—**Investment Analy$t**, a new telecommunications service for Commodore computer users with modems, provides three services to investors: current and historical stock price data, stock performance analysis and stock screening and selection.

In addition to delivering quotes for NYSE, AMEX and NASDAQ stocks and mutual funds, an information tool is provided that can be used to track portfolios, identify market trends, monitor competitors, check insider movement and gather strategic intelligence.

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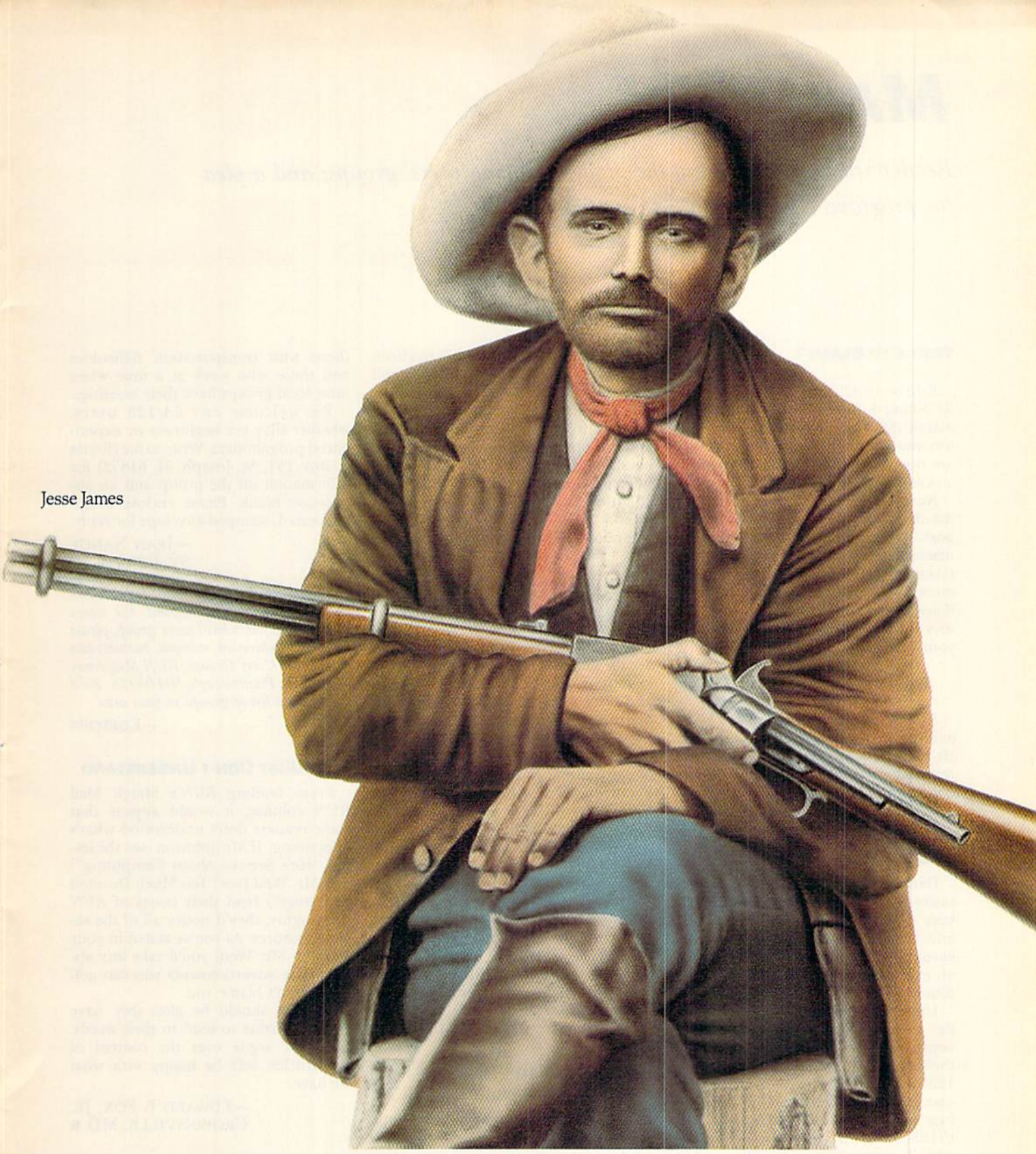

Jesse James

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MAIL RUN

Reader reaction concerning the problems facing users' groups; and a plea for programs supporting RAM expansion units.

WHO'S TO BLAME?

Editor-in-Chief Dennis Brisson's RUNning Ruminations column (*RUN*, March 1990) has hit bottom. Do the editors and writers at *RUN* realize what they are doing to the Commodore industry and consumer market?

Now you're blaming users' groups for the decline in Commodore 8-bit support. In the past, you blamed the manufacturers, then software suppliers were taken to task. Well, Commodore 8-bit owners would not be in such dire straits if you'd stop treating the machines as toys by pushing games and GEOS at your readers.

—DANIEL H. TOTH
BATH, SC

If we were to deny the existence of games and the influence of GEOS in this market, RUN *would mislead its many readers and fail miserably in its role as news reporter, not news maker.*

—EDITORS

STAYING ALIVE

Dennis Brisson's editorials have appeared to be accurate reflections of the state of support for the Commodore 64 and 128. Your editorial in March is no exception. Nor is our local users' group an exception to the deteriorating conditions you mentioned.

Users' groups should re-organize under a new, more generic name, and restructure the organization to reflect the fact that eventually the C-64 and 128 are going to be phased out. To keep users' groups alive means incorporating special interest groups (C-64, C-128, MS-DOS), each of which has its own chairman, its own meetings and its own library.

—WILLIAM H. CLARK
LYNDEN, WA

STILL GOING STRONG

I read the March 1990 editorial about users' groups. Basic Bits Commodore Group of North Ridgeville, Ohio, of which I am program director, has been in operation since September 1986 and now has 84 families in the group. We continue to gain new members, draw support from hardware and software manufacturers, and have a strong market supply through six local dealers. For now, we are busy satisfying C-64 and 128 users and have no need or interest to add MS-DOS, Amiga or any other computers to our support base.

—MICHAEL W. KELLEY
N. RIDGEVILLE, OH

REU SUPPORT

It seems as if serious programmers are neglecting serious users of RAM expansion units such as the 1700, 1750 and 1764. I have yet to see any software made exclusively for them. Let's see some programs that take advantage of the REU's direct memory access instead of just settling for a simple four-command wedge or a 1541 emulator. The Commodore REU is a serious piece of hardware that should get a lot more use than it does.

—RUSS LEWIS
VIRGINIA BEACH, VA

For a list of productivity software that support REUs, see "Packing a Punch" in the December 1989 issue of RUN. *Applications that support the REU include word processors, databases and spreadsheets.*

—EDITORS

MEETING 64/128 USERS THROUGH THE MAIL

You are so right. Many users' groups once devoted to the interests of Commodore users are no longer serving this purpose. I think these groups are deserting the 8-bit Commodores prematurely. As your editorial pointed out, there is life in these machines and there are a great many people who still use them and love them.

Meeting 64/128 Users Through the Mail is a Commodore group that's ideal for the disabled, elderly, rural residents, those with transportation difficulties and those who work at a time when most local groups have their meetings.

We welcome any 64/128 users, whether they are beginners or experienced progammers. Write to me (Route 1, Box 151, St. Joseph, IL 61873) for information on the group and an application blank. Please enclose a self-addressed, stamped envelope for reply.

—JEAN NANCE
ST. JOSEPH, IL

Thanks for the information, Jean. Let us know how our readers respond. For others who'd like to join a local users' group, please send a self-addressed, stamped, business-size envelope to Users' Groups, RUN Magazine, 80 Elm St., Peterborough, NH 03458. We'll send back a list of groups in your area.

—EDITORS

THEY JUST DON'T UNDERSTAND

From reading *RUN*'s March Mail RUN column, it would appear that some readers don't understand what's happening. If Mr. Johnson (see the letter, "He's Serious About Computing") and Mr. West (see "Too Much Devoted to Games") read their issues of *RUN* thoroughly, they'd notice all of the serious features. As you've stated in your reply to Mr. West, you'll take any appropriate advertisements you can get, and I don't blame you.

Readers should be glad they have your magazine to tend to their needs. Let's not argue over the content of the articles; let's be happy with what we have.

—EDWARD F. FOX, JR.
CROWNSVILLE, MD ■

A CALL TO READERS

This page is your stage, so stand up and say a few words. Extend praise, air grievances or offer hands-on advice and information.

Send your letters to Mail RUN, 80 Elm St., Peterborough, NH 03458. Each letter must include the writer's name and complete address. RUN *reserves the right to edit letters for style, clarity and space.*

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SOFTWARE GALLERY

Having fun in the summertime means reviews of football, games, books and (don't tell the kids) education!

By BETH S. JALA

LOU SANDER'S TIPS AND TRICKS FOR COMMODORE COMPUTERS . A
LOU SANDER'S GOLD MINE ... A

Add These Two Books To Your Software Library!

I read both of these books from cover to cover in three nights—a testimony to the fact that I found I was learning something new and that, even though I'm a game reviewer, there are still several games I've given up on simply because I couldn't get past a particular puzzle or level.

Tips and Tricks for Commodore Computers details hundreds of nifty timesavers, short utilities and nice-to-know information for a broad spectrum of Commodore computers. Obviously, the C-64 receives most of the attention, but scattered throughout you'll find dozens of C-128 and Plus/4 hints, and even a chapter that contains tricks for the Amiga and SX-64 computers.

The short chapters (412 pages) cover a broad range of topics: saving money on computer supplies, programming and hardware goodies, computer language tidbits, sound effects, working with numbers and video displays, screen hacks and a lot more.

What really sets this book apart from others of its ilk is the variety and usefulness of the information. And, although the majority of hints were submitted by *Commodore Magazine* readers and authors, many of Sander's own insights are scattered throughout the book. Moreover, the chapters are arranged categorically and indexed for easy reference.

If you're just getting started in the world of Commodore computing, this book will be a gold mine to you. If you're an old hand like me, then you may be pleasantly surprised by how much you don't know!

Speaking of gold mines, you're probably familiar with Sander's column of that name in this magazine. His book, *Gold Mine*, is a compilation of hundreds of useful hints, clues and tips for almost every commercial game written for Commodore computers. As a matter of fact, there are more than 1200 tips (most of which came from readers) on over 500 games!

The games are arranged alphabetically for easy reference. Not only will you find little treasures to help you play many games better, but you'll also discover dozens of secret codes, key presses or pre-boot Pokes that can be used to gain extra lives, points or money in many games.

In the final chapters, you'll find all the game programs listed by publisher, as well as a complete directory, with addresses and telephone numbers.

I'll wager that many of you have a lot of money invested in software that's sitting dormant in your bookcase because you just can't get past a level or find that darn crystal sword. *Gold Mine* may be just the anodyne your battered software library needs. *(Windcrest Books; distributed by TAB Books, Inc., Blue Ridge Summit, PA 17294-0840. Tips and Tricks*, $21.95 *paperback*; *Gold Mine*, $19.95 *paperback*.)

—JOHN RYAN
BILOXI, MS

REPORT CARD

A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles or disappointments here.

D Poor.
This program has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!

LABEL MAKER ..... A

Label, Label, Who's Got the Label?

Labels? You want labels? I've got disk labels ($5^1/_4$- or $3^1/_2$-inch, take your pick). I've got filing labels. I've got standard address labels, audio and video cassette labels.

That's because I've got Label Maker, version 2.0. It does exactly what its name says.

Label Maker comes set up for one dozen popular-sized labels, from "Hello" tags to rotary file cards. If you run out of address labels, the program lets you hand-feed envelopes into a printer; you can use tractor-feed envelopes as well. And if you can't find a label form you want, you can design your own and save it to disk for future use.

Pull-down menus make using Label Maker a simple task. Pressing F1 puts you into the menu options; the cursor keys move you around.

The program has many useful options. A handy one, Increment Field, lets labels be numbered sequentially. Another fixes characters on the screen so they can't be erased or typed over. The Freeze feature lets the return address on an envelope remain the same while other areas change. Label Maker also has a Screen-blanking feature that turns your monitor screen gray after several minutes of no keyboard activity.

Fill fields lets up to nine fields of data merge into labels. The manual gives specific instructions for making fill files using Data Manager 2, Data Manager 128, Fleet Filer, Superbase and The Consultant. It also explains how to create fill files using three popular word processors: Easy Script, Fleet System and PaperClip.

Printer codes can be embedded into ►

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Circle 86 on Reader Service card.

the label lines to take advantage of your printer's various typefaces. The program can also handle from one to 12 labels across the page.

The clearly written documentation recommends that users make a backup copy of the program to use as a working copy. That's good advice, and keeping copy protection away from productivity software is a laudable marketing practice.

Label Maker isn't flashy or exciting—even its title is lackluster. But it does what it was designed to do, with no

Printing on Rolodex cards demonstrates Label Maker's versatility.

hassle for the user. I'll take that over busy displays and colorful packaging any day. *(Keystone Software, PO Box 8369, Pittsburgh, PA 15218. C-64/$29.95.)*

—LONNIE BROWN
LAKELAND, FL

CLIMATE AND WEATHER DATABASES ..... B+

Courseware for Future Meteorologists

You are an employee of Climate Finders, Inc., an electronic data research agency that specializes in "travel and relocation." You've been asked to find nontropical places on earth where it's never below freezing, so that a man can travel without endangering his Gila monster. Do you know how to obtain this information—quickly?

You do if you're familiar with Climate and Weather Databases, a set of files designed for use with the Bank Street School Filer. With this program, students in grades four through 12 can research many facets of climate and weather, while becoming proficient in database manipulation.

The software contains three files: World, Weather and USA. The World database provides climatic facts for 72 weather stations around the globe. As employees of Climate Finders, Inc., students research this file and respond to information requests. The Weather file is a database of information students input regarding local weather. The USA database provides facts for 52 weather stations in the U.S.—January and July temperatures, record highs and lows and precipitation, for example.

If students are not familiar with the use of a database or the Bank Street School Filer, a teacher will have to spend some time familiarizing them with the procedures for accessing and utilizing the databases.

The Teacher's Guide includes a summary of each database, sample records, detailed lesson plans, follow-up activities and student materials. The first five Climate Finders requests are accompanied by detailed worksheets to help students obtain the needed information from the database; additional requests come with hints for them and an answer key for the teacher. Also included in the Guide are various maps, temperature charts, cloud descriptions, instructions for making weather instruments, generalizations you can draw from researching the files, and the scientific explanations for each generalization.

The suggested activities are clever and workable. The Teacher's Guide is, however, extremely cumbersome. Although it contains a wealth of information, it's not well organized or easily accessible. There's no index, no glossary and no suggestions on how to lead students to reach generalizations.

Nonetheless, Climate and Weather Databases should be a valuable resource for any school interested in training students to use more than an encyclopedia for research. And it should provide any classroom with plenty of data on weather and climate. *(Sunburst Communications, 39 Washington Ave., Pleasantville, NY 10570. C-64/$59; $177 for the 10-disk lab pack.)*

—SHARON G. WEINER
CHICAGO, IL

JOHN MADDEN FOOTBALL .... A

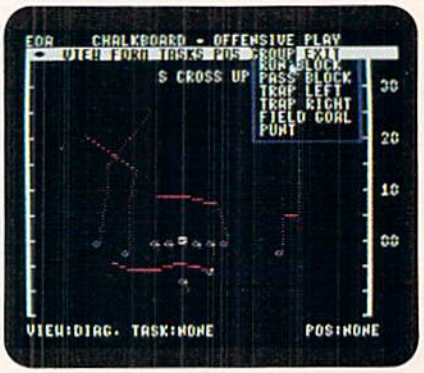
Let's Go to The Chalkboard!

This simulation might just change the way people think about computer football software.

John Madden Football (JMF) can be played as an action game, where key players are manually controlled, or as a strategy game, where you select the play and let the computer handle movement. You can play against a friend or against John Madden as the computer coach. Or, if you want to enjoy the game as a spectator, have Madden coach both the home and visiting teams.

Prior to play, you set up field conditions and the number of minutes per quarter, along with toggling on and off several other critical functions, including fatigue, penalties, injuries, play recap and the 30-second clock.

There are ten teams to choose from, each with its own strengths and weaknesses, and each player has his general ratings. On the field, you must not only determine the appropriate plays to use, but also keep track of the players' health



Just one of the many screens in feature-laden John Madden Football.

and performance as the game progresses.

You deal with three basic views in JMF: the huddle, the field and the stadium. The field and stadium views place you above the players at approximately a 45-degree angle. This adds a three-dimensional look to the game that's essential to this type of simulation.

JMF offers a Practice option and also includes a chalkboard play-diagramming utility. Moreover, you can create new playbooks to hold your plays, or redesign those already in existence. With the Madden Report feature, you can easily get an at-a-glance comparison of two teams. Finally, JMF lets you edit each team—change player numbers, names, injury status and ratings to your liking.

As an action game, the switch from the close-up view to stadium view can become confusing because it's hard to distinguish your players. Likewise, taking control of the runner becomes difficult if your man gets in a crowd.

JMF is a statistician's dream. And, while the joystick selection method of double clicking takes some getting used to, the program layout and logical menu setups make getting into the coaching business very easy. Depending on what options you toggle, disk activity can be fairly regular, although load times are not intolerable.

JMF has its quirks, but it could become the definitive C-64 football simulation. With its superb documentation and a quick-start program to ease you in, about the only thing missing from John Madden Football is the locker room! *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95.)*

—JOHN RYAN
BILOXI, MS

EYE OF HORUS C

The Stage is Set With Ancient Mazes and Keys, Amulets and Elevators

An evil Egyptian named Set has torn the corpse of his half-brother Osiris into seven pieces, scattering them throughout a cavernous tomb. As Osiris' son, Horus, you must locate all seven parts, return them to your father's sarcophagus and defeat your villainous uncle. Success in this is no easy matter; in fact, you might find it downright impossible.

Initially, you have only three lives, but others may be earned with some difficulty. Travelling across a series of horizontally scrolling chambers, you encounter animated hieroglyphics that fly out of the walls and attack you. Unless you can shoot them with your papyrus darts, they'll drain your energy and cost you one of your lives.

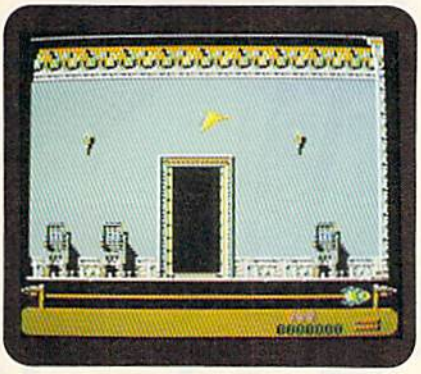
On the ground, you portray a slow-moving, human character. In the air, you assume the role of a hawk capable of moving rapidly and maneuvering around many deadly obstacles. Unfortunately, to pick up body parts, keys and amulets, you must walk past them, which leaves you hopelessly vulnerable to endless waves of attackers.

Transporting you between the tomb's numerous levels are a series of elevators. Many are locked and may be entered only if you possess the appropriately colored key.

Each amulet increases your power or summons a divine being to assist you. To transport Osiris's remains to the sarcophagus, to reassemble his body and to call up a map of your whereabouts all require specific amulets.

You control your movement quite easily by flicking the joystick, and you discharge your weapon by pressing the firebutton. Selecting keys and amulets from the inventory and viewing the map are accomplished in a like manner.

Graphically, the program is no masterpiece, but its many rooms are elaborately



In Eye of Horus, you're able to move around as a hawk in flight.

decorated with all sorts of signs and symbols, and animation is impressive.

To gain access to the program, you must type in an activation code from a four-page booklet, which contains nearly 2000 six-digit numbers. The tiny print on dark red paper is designed to make photocopying difficult. It also makes locating the appropriate code almost as impossible as completing the game.

Players looking for a challenging, action-packed contest sporting an Egyptian theme might find Eye of Horus entertaining. Others, however, may be disappointed by its lack of originality or thwarted by its difficulty level. *(Britannica Software, 345 Fourth St., San Francisco, CA 94107. C-64/$29.95.)*

—LEN POGGIALI
SYRACUSE, NY

FUN HOUSE ..... D

Fun House does a less than adequate job of recreating the look and feel of the TV game show. Not only are many of the elements missing, but what remains provides neither the fun nor the excitement of the original.

One or two players compete in a round consisting of three simple stunts, and another in which a trio of trivia questions are posed. All stunts are controlled somewhat awkwardly using the keyboard, but quite easily with the joystick.

The multiple-choice trivia questions range in difficulty from the very basic to the relatively esoteric. Since the questions reside, along with the program, on the front of the disk, be prepared to see the same ones again and again.

Particularly disappointing is the Fun House, which in no way resembles the three-tiered, upright, gaudy TV structure. The program provides only three simple mazes, viewed from overhead, with a small square representing the player. Gathering prizes increases your score; hitting booby traps costs you points; and touching chutes takes you to another level. Unfortunately, all of this is a waste of time, for you've already won the game, and you can't take your prizes with you.

Youngsters will quickly tire of Fun House. The graphics are IBM CGA-quality, and the music and sound effects are equally unsophisticated. Worse yet, the Single Player option lacks a computer opponent, and there is no real head-to-head competition between players in the Two Player mode.

As a facsimile of the TV show and as a computer party game, this program will bring very little fun to anyone's house. *(Hi Tech Expressions, 584 Broadway, New York, NY. C-64/$12.99.)*

—LEN POGGIALI

VEGAS CASINO 2 ..... E

According to many gambling experts, there are only two kinds of casino games: those played for *fun* and those played for *money*. Vegas Casino 2 includes one of each type of game (roulette and craps), supplies on-disk odds information, and challenges one to four players to beat the house.

Unfortunately, while Casino 2 designers were busy writing Las Vegas rules into help files, they seem to have paid little attention to Las Vegas play and pizzazz. Roulette's "big wheel" commands barely a sixth of the screen, and, with regard to craps, your tumbling dice are just large enough to qualify as squarish objects. Chips, limited to a single value before play begins, fare no better, for only the currently selected player's chips are displayed. You see a tiny circle with a number indicating chips placed, and upon a spin or roll of the dice, all chips vanish from the betting table. Only when reselected does a player see the results of a bet; that is, unless his or her chip color happens to match a part of the table!

Besides misdocumented key functions, an unusable mouse interface, incorrect placement of winnings and a Bank Roll display that never seems to change, you'll also have to put up with a "Return to Main Menu" function (to change games) that doesn't work. Add ultra-long load times plus the absence of any on-disk "Big Winners" roster, and you've got plenty of good reasons to place your bets elsewhere. *(Virgin Mastertronic, Inc., 18001 Cowan, Irvine, CA 92714. C-64/$9.99.)*

—JEFF HURLBURT ■

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More Power

If you're considering the purchase of a Commodore 1581 disk drive, you'll want to learn more about how this little beige box operates, and how best to exploit its special features, such as partitioning. The 1581 is not only faster than the 1541 and 1571 drives, but it has plenty of commercial support, uses smaller disks that hold more data and also performs functions that are clear improvements over those earlier drives.

Big in Capacity—And Fast, To Boot

The 1581, released in 1987, is the solution to the search for a good, inexpensive mass storage device. The $3^1/_2$-inch, double-sided disk holds more than 800K of data when formatted in the 1581 drive, providing a full 3160 blocks of data storage. The 1581's directory can address 296 files, and, by using the drive's special partition feature, 296 files may be stored in each partition. Compared to the Commodore 1571 disk drive, which has been discontinued, the 1581 has roughly two-and-a-half times the storage capacity for about the same price.

In addition, the 1581 is very fast. It uses both standard and fast serial data transfer rates, automatically matching the operating mode of the C-64 or 128, but you can transfer data even more rapidly through the drive's special high-speed Burst commands, available to C-128 machine language programs. Another factor contributing to fast data transfer is the minimal head movement made possible by the way the 1581 stores information on a disk.

Getting Set

Getting your 1581 drive up, ready and running is a lot like setting up other Commodore drives. First make sure the drive's power switch is off, then connect the power supply by plugging its cords into the drive and a wall outlet or power strip. Place the power unit as far as possible from your computer and disk drive to reduce radio frequency interference.

With the computer and all peripherals turned off, plug the interface cable from the serial port on the back of the 1581 into either the back of another drive or directly into the back of the computer. Your printer or other serial devices plug into the interface port on the back of the 1581.

Now remove the cardboard insert from the drive slot. Turn on the 1581 and other peripherals in any order; then turn on the computer last. (On startup, the drive performs a self-test: The green activity light will flash once, while the red power light should glow steadily.)

The 1581 as a Second Drive

One way to take advantage of the 1581's speed and storage capacity is to load and run your word processor, database or spreadsheet software from your 1541 or 1571 drive, and use your 1581 as the data storage unit. In order to use more than one disk drive, however, you must make sure that the drives have different device numbers. If they're both set to the same number, your computer system will lock up. Customarily, a 1541 or 1571 is set to device 8, with other drives configured to consecutively higher numbers. Keep in mind, however, that most software is usually designed to run from drive #8.

You can choose the device number for your 1581 simply by flipping the two switches on the back of the drive. Viewed from the rear, with the drive turned off, use these settings: for device #8, set both switches to the up position; for device #9, set the left switch down and the right switch up; for #10, set the left switch up and the right switch down; and for #11, set both switches down.

If you need to change the drive's device number temporarily, either from within a program or in Direct mode, you can do so via software by entering this command:

```
OPEN15,old device number,15,"U0>"+CHR$(new device number):CLOSE15
```

The new device number *may* be anything from 4 to 30, but remember that standard disk drive devices are numbered 8 to 11 only, and software programs will generally not recognize other numbers. If you're starting out with two drives using the same device number, the drive whose device number you *don't* want changed must be turned off before executing this command.

About the $3^1/_2$-Inch Floppy Disk

The magnetic material encased in a $3^1/_2$-inch disk is the same medium used in other floppy disks, but more data may be written to it. The disk's shell is sturdy to protect it against bending and crimping.

To use the 1581 disk, insert it into the drive with the hub facing down and the metal collar facing the drive. Once the disk is inside, the shutter slides aside to expose the magnetic medium to the read-write heads. You remove the disk from the drive

to You

Experience life in the fast lane with the 1581—the little disk drive with the big capacity.

(after the green operating light is out) by pushing in the disk-eject button on the front of the drive housing.

One surprising difference between the 5¼- and 3½-inch disk is that the write-protect switch in the corner of the smaller disk works in the opposite way from the larger's write-protect tab: When the 3½-inch disk's hole is uncovered, the disk is write-protected and cannot be written to; when the hole is covered by the sliding tab, the disk is now write-enabled and will receive information from the drive.

The 1581 uses the same command set as the 1541 and 1571 drives, with additional commands to address partitions. Before using the disk, you must format it with the DOS New command. The Save command writes information to the disk, and the Load command reads programs and data from it. These and other DOS commands are detailed in Table 1.

Partitions

If you like to store dozens, or even hundreds, of files on a single disk, then you'll appreciate the function of partitions on 1581 disks. Partitioning allows you to divide a disk so that you can organize your programs into database files, text files, graphics files, utility files, and so on.

Some users may find handling partitions a bit intimidating, but help is available in the form of the Partition Aid program on the demo disk that comes with your 1581, as well as in many commercial and public domain utilities. (See "The Anatomy of 1581 Partitions" sidebar that accompanies this article for more details about partitions and partitioning, and Table 2 for some available partitioning utilities.)

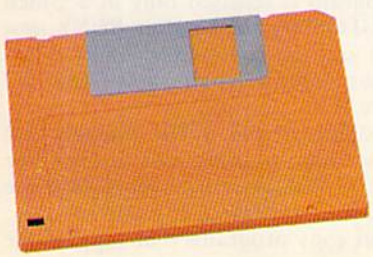
Converting to 3½-Inch Format

Because a 1581 disk is configured differently (its directory is not on track 18, but track 40, for instance), you need a file-copy utility such as *RUN*'s RUN Shell or RUN Copy 64 or 128 to transfer your (noncopy-protected) programs and data from 5¼-inch to 3½-inch disks. Commodore's DOS Shell program won't do the job.

Duplicating 3½-inch disks is best accomplished through the use of a second 1581 drive. If you have a 1750 RAM expansion unit, there are public domain utilities that take advantage of the 1750 to make single-drive disk copying quicker and less tiresome.

Lots of Commercial Support

The 3½-inch format is actively supported by several commercial programs, such as UltraTerm III (a telecommunications program), The Write Stuff (a word processor) and Basic 8 (a computer language for the C-128). A number of software ►



By ELLEN RULE

The Anatomy of 1581 Partitions

PARTITIONING DIVIDES A DISK into subsections, called partitions, much as a file cabinet is divided into drawers. These divisions are helpful in splitting the disk into separate areas so that you can organize the contents into text files, database files, graphics files, and so on. An example of a partition is PIC.DIR on the 1581 Demo/Utilities disk. It contains pictures compressed for use with the 128 slide show program on that same disk.

You can easily create a partition with the command:

```
OPEN15,device#,15:PRINT#15,
"/0:partition name,"+CHR$(starting
track)+CHR$(starting disk
block)+CHR$(low byte # of disk
blocks)+CHR$(high byte # of disk
blocks)+",C":CLOSE15
```

Let's take a closer look at this. First, a channel is opened (OPEN15) to the device number of your 1581 drive. The PRINT#15 directs the Partition Command statement (the part in quotes) to the drive channel. The drive recognizes the slash as a partition command. Partition areas have names just like other 1581 files. The values contained in the CHR$ commands describe the partition to be created. The first (decimal) value is the starting track (1–80) of the partition, and the next value is the starting disk block (sector) (0–39). A utility such as SHOW BAM (on the 1581 Demo/Utility disk) displays the free areas on the disk. (Don't include track 40, the disk directory's track, in your partition.)

Next, two bytes are used to tell the computer the size of a partition in disk blocks. Since a single byte can contain the values of 0 to 255, two bytes are used to specify partitions greater than 255 disk blocks. To calculate the values of high byte and low byte, use this Basic program (the term sector is used here instead of disk block):

```
10 INPUT "# OF SECTORS";SECT
20 HI=INT(SECT/256)
30 LO=SECT-HI*256
40 PRINT "LOW=";LO;
   "HIGH=";HI
```

Within a partition command, the size of the partition is expressed as low-byte, high-byte, a standard method of expressing multiple-byte values. For example, a partition of 1500 disk blocks would be described as a low byte of 220 and a high byte of 5. For another example, a partition of 120 disk blocks would be described as a low byte of 120 and a high byte of zero.

If a partition is large enough, it can be used as a subdirectory. To qualify, the partition must be at least 120 disk blocks long, the starting disk block must be zero (0), the ending disk block must be a multiple of 40, and the partition cannot contain track 40 (because this is where the disk's root directory, which is a directory of all the partitions themselves, is located). You enter into a partition area with the command:

```
OPEN15,device#,15,"/0:partition name"
:CLOSE15
```

The first time you open a disk partition, you must format it. To avoid formatting the entire disk, first make sure you've selected the partition properly by checking the error channel. This bit of Basic code opens a partition with a user-specified device number and partition name:

```
10 OPEN15,device#,15,"/0:partition
   name"
20 INPUT#15,EN,EM$,ET,ES
30 PRINT EN,EM$
40 PRINT ET,ES
50 CLOSE15
```

When you run this program, the message 02, SELECTED PARTITION, FIRST TRACK #, LAST TRACK # verifies that you have entered the partition. However, if you get the error message 77,SELECTED PARTITION ILLEGAL,00,00, it means that you've either misspelled the name or the partition doesn't exist.

Now that you've opened a partition, you format it with the following command, giving it a name and a two-character ID that you specify:

```
OPEN15,device#,15,"N0:name,ID":
CLOSE15
```

Once formatted, the first track of the disk partition holds file information, functioning like the disk's root directory. The selected partition becomes the default work area, making files outside of the partition virtually invisible. To exit a partition, enter

```
OPEN15,device#,15,"/":CLOSE15
```

and this will send you back to the root directory, where you can open other partitions.

If you want to remove a partition and all files contained therein, use the Scratch command:

```
OPEN15,device#,15, "S0:partition
name": CLOSE15
```

—ER

houses, such as Abacus, S.O.G.W.A.P. (makers of the Big Blue Reader) and Professional Software (which publishes the Fleet System software series) offer many of their programs on $3^1/_2$-inch format for a $10 to $15 charge. Superbase 3.0 (a database) can be ordered in both disk formats.

Copy-protected $5^1/_4$-inch disks are not easily transferred to $3^1/_2$-inch format. However, commercial software that's not copy protected (for example, Electronic Arts' PaperClip III and PaperClip Publisher), or is dongle-protected (such as Xetec's FontMaster 128), can be file-copied onto a $3^1/_2$-inch disk. As with public domain and type-in programs, commercial software that addresses specific tracks will give you problems in the 1581 drive.

If you're a QuantumLink subscriber, you normally download files with a 1541 or a 1571, but with a patch from Q-Link, you can use your 1581 drive as the default drive whenever you wish to download something.

Using a 1581 drive with Berkeley Softworks' GEOS 2.0 system (earlier versions of GEOS are incompatible with the 1581) may keep you from ever looking at another brand of computer. While the program is released only in $5^1/_4$-inch format, both the 1581 GEOS Bootmaker (on *RUN*'s new GEOS Companion Disk) and the commercial utility, Maverick V.4 (Software Support International), allow GEOS 2.0 to boot from a 1581 drive.

There are software utilities in the public domain that transfer copy-protected software to other disk formats (for example, DM.UNPROTECT.SDA, American PeopleLink file #6794, will copy Timeworks' Data Manager to a 1581).

Fast-load cartridges and copy programs that support the

1581 drive include Super Snapshot V.5 and the WarpSpeed cartridge (see Table 2 for more information). Similar cartridges marketed before 1987 probably support only the 1541 and 1571 drives.

Utilities expressly for use with the 1581 drive include Super '81 Utilities, from Free Spirit Software, and the 1581 Toolkit V.2, from Software Support International. These packages feature fast disk and file copiers, fast formatters, partition utilities, track and disk block editors, directory editors, and other programs to make your 1581 files more efficient.

The 1581 Demo/Utilities disk that's included with the 1581 contains copy and back-up programs, BAM and disk block utilities, partition aid, and machine language source examples. (Tip: If the program, Burst subs.src on your demo disk shows 84 blocks, you'll need to obtain the 112-block version, available from a commercial BBS or your local user group library.) A multitude of utilities designed to work with the 1581 disk drive also exist in the public domain. ■

Ellen Rule is a regular contributor to the pages of RUN *and the columnist for Commodore Clinic. She enjoys using her 1581 as a second drive.*

Table 1. C-64 and C-128 1581 disk drive commands.

To access the 1581 drive with a C-64:
OPEN15,device#,15,command:CLOSE15
C-128 users may issue commands (other than partition commands) directly.

To format a disk on the C-64:
OPEN15,device#,15,"Ndrive#:diskname,id":CLOSE15
For example, to format a disk in device #9:
OPEN15,9,15,"N0:MYDISK,AB":CLOSE15
(Note: MYDISK is the disk's name and AB is an ID unique to that disk.)

To format a disk on the C-128:
HEADER "diskname, Iid, Ddevice#[,Udrive#]"
For example, HEADER "MYDISK,IAB,D9,U0" formats the disk named "MYDISK" with the identification (ID) of "AB", where the device number is 9 and the drive unit is 0. (The brackets around "Udrive#" in the command line indicate an optional parameter; the value, if you do not specify, defaults to drive 0.)
To quick-format a previously formatted disk, use the format command without the ID.

To save a program on the C-64:
SAVE"filename",device#
To save a program on the C-128:
DSAVE"filename",device#

To verify that a Basic program saved to disk matches the contents of your Basic memory:
VERIFY"filename",device# (for C-64)
DVERIFY"filename",device# (for C-128)

To load a C-64 program:
LOAD"filename",device#
To load a C-128 program:
DLOAD"filename",device#

Basic 2.0 (C-64) commands:
To copy a file: OPEN15,8,15,"C0:new file=0:old file":CLOSE15
To rename a file: OPEN15,8,15,"R0:new name=old name":CLOSE15
To scratch a file: OPEN15,8,15,"S0:filename":CLOSE15
To validate a disk: OPEN15,8,15,"V0":CLOSE15
To initialize (reset) a drive: OPEN15,8,15,"I0":CLOSE15

Basic 7.0 (C-128) commands:
To copy a file: COPY "old file" TO "new file"
To rename a file: RENAME "old file" TO "new file"
To scratch a file: SCRATCH "filename"
To validate a disk: COLLECT
To initialize (reset) a drive: DCLEAR

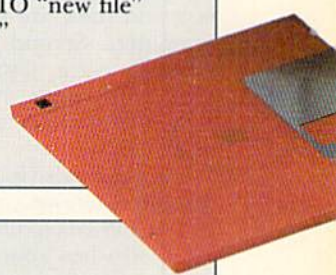


Table 2. Commercial utilities and publications designed specifically for use with the 1581 drive.

1581 Toolkit V.2—Software Support International, 2700 NE Andresen Rd., Vancouver, WA 98661. C-64. Fast disk and file copier, partition creator with visual representation of the disk structure, fast formatter, track and disk block editor, directory editor. REU support and 64K video RAM support for 128 owners.

1581 DOS Reference Guide—Software Support International (address above). Learn the inner workings of the 1581 drive. Technically oriented; designed to complement the 1581 manual.

Super '81 Utilities—Free Spirit Software, PO Box 128, Kutztown, PA 19530. For the non-programming user; options window, no need to memorize commands. Partition commands: Create, Copy, Manipulate, Enter and Exit partitions; copy up to 50 files consecutively; disk copy 1571 disk to a 1581 partition. (Won't duplicate the placement of data on the disk, essential to some copy-protection schemes.) Create autoboot. Auto-configures to system as long as drives are on before booting; autoboots from drive #8.

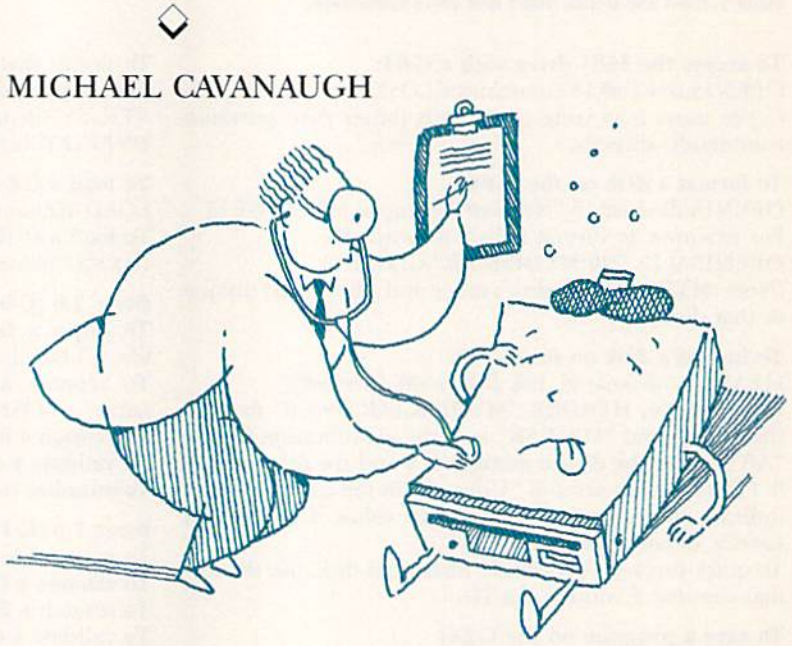
Super Snapshot V.5—Software Support International (address above). Save and load faster with 1541, 1571, 1581 drives. Includes terminal program, utility to archive programs resident in memory, screen-copy and file management programs, partition support. Copiers and nibblers make use of REU.

WarpSpeed cartridge—Tenex, 56790 Magnetic Drive, Mishawaka, IN 46545. Loads, saves, formats, verifies up to ten times faster on the 1581.

1581 Demo/Utilities Disk (included with the 1581)—Partition aid and sample partition, file-copy programs, auto-run and compression utilities, disk block editor and BAM utilities, and machine language examples to access Burst routines are among the utilities on the disk.

Do-It-Yourself Troubleshooting

If preventive maintenance fails, you can take matters into your own hands with these diagnostic tools.



By MICHAEL CAVANAUGH

All things electrical or mechanical eventually break down, and, even sturdy as they are, Commodores are no exception. Now, with both parts and service centers for C-64s and 128s becoming ever more difficult to find, it's increasingly important for Commodore owners to delay the inevitable for as long as possible through preventive maintenance and by themselves learning to deal with problem situations as they arise.

The Basics

There are a few fundamentals all computer owners should know. First, heat and static are natural enemies of computers. Second, mechanical parts generally wear faster than electrical ones. With this in mind, you can take certain steps to prolong the life of your machine.

Use a power strip. It's nothing more than an extension cord with a series of outlets and an on/off switch, but switching it off when your equipment is not in use cuts off electricity to the power supply, thereby reducing heat buildup.

Use surge protectors. Buy them for both your electrical outlets and your phone line, because strong power surges can damage computers and modems. A surge protector acts like a fuse, breaking the circuit before your equipment is damaged. Note that even with surge protectors, it's still best to unplug all equipment during an electrical storm—a power surge and a lightning strike are not the same thing.

Use an anti-static mat, versions of which are available for both the floor and desk. Dry winter air and wool carpets are especially conducive to static charges. Touch something metal, like the arm of a chair, to discharge any static buildup in your body before using your computer equipment.

The 1541 is infamous for going out of alignment. Copy protection schemes are the biggest offenders, since they cause the head to bang into the head stop assembly. Take advantage of DOS wedge programs that include a command to disable head bumping. Consider using a software program that strips off copy protection. This is *not* an endorsement of software piracy. I assume you would remove copy protection only from a program that you have legitimately purchased.

"Who Ya Gonna Call?"

What happens, however, when disaster does strike? First, try to discover which device is at fault. Contact a friend with the same setup and test your equipment, piece by piece and in varying combinations, on his or her system until you isolate the culprit. Be sure also to test your cables and power supply.

A double-sided, laminated reference sheet called **The Commodore Diagnostician II** can help you in your search for the causes of equipment ailments. Set up like a spreadsheet, one side has rows of symptoms intersecting with column listings of probable faulty components (depending on what you own—C-64/64C or C-128/128D). The flip side of the sheet lists mechanical adjustments that you can make to your 1541 in response to indicated symptoms. It also includes a list of the locations of specific chips on the PC board. While The Grapevine Group's Commodore Diagnostician II won't help you correct a problem, it can certainly aid in identifying it.

Repairs to the CPU are probably beyond the capabilities of most users, and the same applies to the monitor. But before you take either to a professional, consider a few alternatives. See if anyone at your local users' group can be of assistance. You'll probably be pleasantly surprised at the pool of available talent there. Also, evaluate the worth of the equipment in question. Visit a local flea market or scan the classified ads section of a BBS to find the going prices for used equipment. Outright replacement is usually cheaper than repair.

Disk Drive Dilemmas

Disk drives are a different story, but before attempting to do any work on your 1541, you should consider viewing ►

ILLUSTRATED BY RAYMOND MEDICI

Computer Restore's videotape, ***How to Repair Your Commodore 1541 Disk Drive***. Its eight sections cover topics ranging from preventive maintenance to complete mechanical disassembly of the 1541.

Although the production values are crude, the tape does a terrific job of explaining how to address almost any of the problems that might befall a 1541. Since this is virtually a videoshop manual, its purchase should be high on the priority list of any Commodore users' group that has a reference library for its members.

Even armed with the videotape, adjustments to a disk drive still require software. Two programs that meet this need are Free Spirit's **1541/1571 Drive Alignment** and North Coast Computers' **Disk Alignment Tool**. The former offers diagnostic and repair operations for both the 1541 and 1571 drives, while the latter is restricted to the 1541 and concentrates more on problem correction than detection.

These programs are not for the faint-hearted. Both require making adjustments with the drive disassembled and the power on. You therefore must take special care to avoid damaging any internal parts or getting an electric shock. In addition, a clean working environment is a must to prevent dust or dirt from contaminating the interior's mechanical parts.

While the instructions for both programs are quite straightforward, the descriptions and drawings of the various drives leave something to be desired. There is, for example, a disagreement between the two programs as to the location of the 1541's speed adjustment. Some of the confusion may be attributed to various 1541 design modifications made by Commodore.

Developed only for the 1541, Disk Alignment Tool's directions are more detailed. Included with the software is the actual alignment tool: a series of ten LEDs, powered by two 9-volt batteries. You splice this into the circuitry of the 1541 with a pair of alligator clips, and you see that alignment is achieved when the maximum number of LEDs are at their brightest. You set the zero stop with a feeler gauge and adjust drive speed by using a small paper strobe pattern attached to the underside of the 1541.

On the other hand, no hardware accompanies the Free Spirit program. Instead, you run a diagnostic disk that tells you if the drive is within acceptable tolerances. You then make adjustments to the drive and run the disk again to determine proper calibration. There's more trial and error than with the Disk Alignment Tool, and it takes longer.

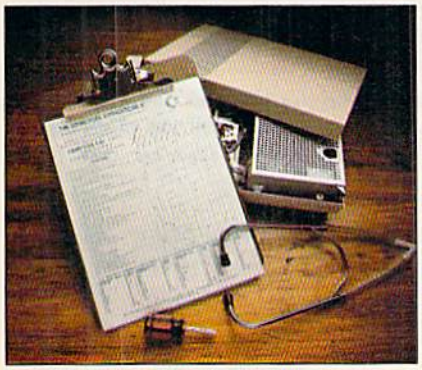
Even so, at $69.95—more than half the price of a new 1541 clone—it's hard to recommend the purchase of Disk Alignment Tool for individual users. Free Spirit's 1541/1571 Drive Alignment is a less expensive, albeit somewhat cruder, alternative. Once again, investment on the part of a users' group might be a better way to go.

Before Proceeding

While both of the aforementioned programs do what they promise, a couple of caveats do apply. Drive alignment is a repair, not part of routine maintenance. Follow the old adage, "If it ain't broke, don't fix it." Also consider that the problem may not be alignment at all, or that it might be too severe for you to correct, or that you might damage the drive while attempting the repairs.

This is not to say that the average user cannot adjust a disk drive, because thousands have done so successfully. Rather, I just want to point out that, in some cases, you might fare better taking steps that prevent or delay problems as long as possible, and then replace or upgrade, rather than repair. ■

Michael Cavanaugh, a field supervisor for the Pennsylvania Bureau of Standard Weights and Measures, has contributed many articles to RUN *over the years.*



The Commodore Diagnostician II.

How to Repair Your 1541 Disk Drive.

The Disk Alignment Tool.

1541/1571 Drive Alignment.

Table 1. Manufacturers' addresses.

The Commodore Diagnostician II
The Grapevine Group, Inc.
35 Charlotte Drive
Wesley Hills, NY 10977
$6.95

How to Repair Your Commodore 1541 Disk Drive
Computer Restore
1216 Elm Hills Rd.
Sedalia, MO 65301
$35

1541/1571 Drive Alignment
Free Spirit Software
PO Box 128
Kutztown, PA 19530
$34.95

Disk Alignment Tool
North Coast Computers
791 Eighth St.
Arcata, CA 95521
$69.95

The Palette-able 64

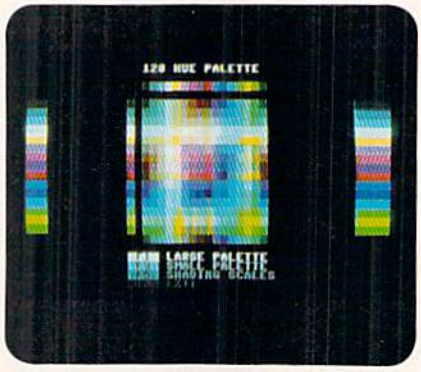
You can mix the C-64's 16 primary colors to create more hues than you thought possible.

By RICHARD PENN

If you thought your C-64 was limited to 16 colors, get ready for a surprise. Palette 64 produces an extravaganza of 128 distinct hues, the built-in 16 plus 112 more mixtures!

A demonstration program operating in Hi-Res mode, Palette 64 offers three screen displays that are accessed with the function keys. Press F1 or F3 to see a large or small palette of the 128 colors. Each palette is a matrix, with the 16 built-in colors running horizontally and vertically and a different hue filling the cell at each intersection. Press F5 to see an assortment of color scales, or progressions, and F7 to exit the program. The color-scale display also appears first when you run the program.

The 112 "mixed" colors are created through a "dithering" technique, in which pixels of two different colors alternate rapidly in a checkerboard pattern to produce the appearance of a third color. Dithering is usually done in Multicolor mode, but in Hi-Res mode it produces smoother color blending because of the smaller pixels. If you have some knowledge of programming in Basic, an examination of this program can show you how the dithering technique is accomplished.



The C-64's remarkable shading of color.

Type in Listing 1, using *RUN*'s Checksum program to detect typing errors; then save it to disk. When you run it, it will change the way you think about color on the C-64! R

Richard Penn, a steady contributor of Magic tricks to RUN, *is especially interested in developing programs that break new ground in C-64 graphics.*

Listing 1. The Palette 64 program. (Available on ReRUN disk. See order card facing page 24.) When entering this listing, be certain that you type in the spaces between any Control and Commodore key commands in lines 150, 170 and lines 430–460. For example, in line 150, beginning with {COMD 4}. . ., you'd first hold down the Commodore key, press the 4 key, release both keys, press and release the space bar, then hold down the Commodore key, press the 5 key, and so on.

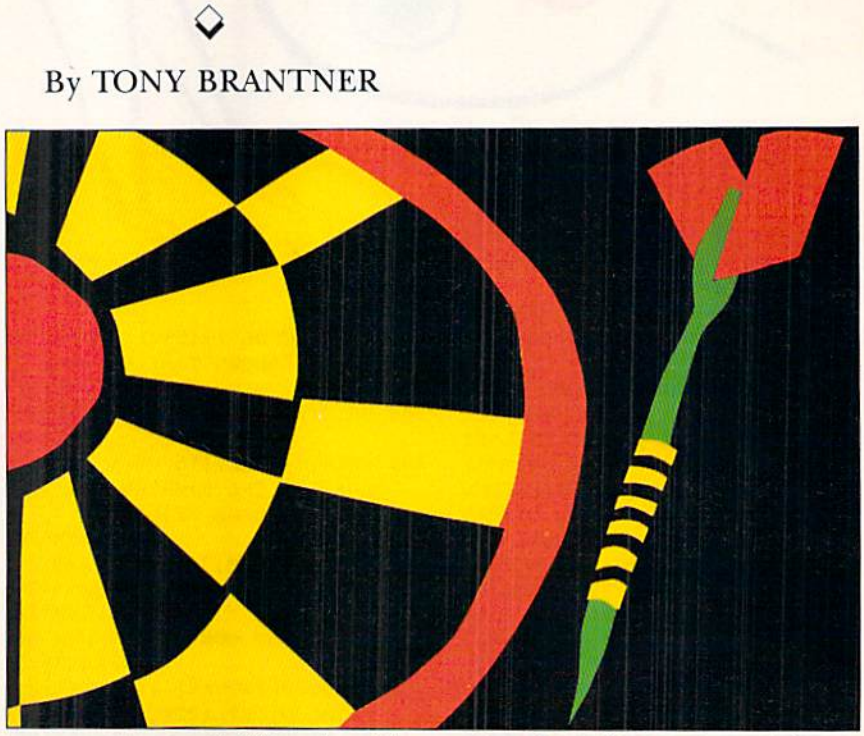
```
10 REM HUE PALETTE FOR THE 64 -
    RICHARD PENN          :REM*241
20 POKE53280,0:POKE53281,0:PRIN
   T"{SHFT CLR}{8 CRSR DNs}"CHR
   $(142)CHR$(8)          :REM*25
30 PRINTTAB(16)"{COMD 4}ONE":PR
   INTTAB(16)"{COMD 5}MOMENT":P
   RINTTAB(16)"{COMD 8}PLEASE{C
   TRL 2}..."             :REM*62
40 GOSUB590:REM INSTALL ML ROUT
   INES                   :REM*207
50 GOSUB730:REM REDEFINE DITHER
   ING CHR                :REM*115
60 RESTORE                :REM*200
70 FORT=50000TO50000+255:POKET,
   0:NEXT:FORT=50256TO50256+255
   :POKET,0:NEXT          :REM*56
80 L=4:Q=5000+L*8:FORT=QTOQ+15
   *8STEP8:READX:FORZ=TTOT+7:PO
   KEZ,X:NEXT:NEXT        :REM*245
90 PRINT"{SHFT CLR}";:FORT=1TO9
   99:PRINT"{CTRL 9}{CTRL 1} ";
   :NEXT:POKE2023,160:POKE56295
   ,0                     :REM*249
100 FORT=217TO242:POKET,PEEK(T)
    OR128:NEXT            :REM*38
110 SYS49152:GOSUB290:GOSUB480:
    POKE2,0:SYS2          :REM*218
120 REM PRINT SMALL GRID SUB
                          :REM*81
130 SYS679:G=1:GOSUB550:PRINT"{
    HOME}"TAB(13)"{CTRL 2}128 H
    UE PALETTE"           :REM*134
140 PRINT"{HOME}";:FORT=1TOL-2:
    PRINT:NEXT            :REM*185
150 PRINTTAB(13)"{CTRL 9}{COMD
    4} {COMD 5} {COMD 8} {CTRL
    2} {CTRL 8} {COMD 3} {COMD
    1} {CTRL 3} {COMD 2} {CTRL
    5} {CTRL 7} {COMD 7} {CTRL
    4} {COMD 6} {CTRL 6} {COMD
    4} "                  :REM*141
160 PRINT"{HOME}";:FORT=1TOL:PR
    INT:NEXT              :REM*178
170 PRINTTAB(11)"{CTRL 9}{COMD
    4} {CRSR DN}{CRSR LF}{COMD
    5} {CRSR DN}{CRSR LF}{COMD
    8} {CRSR DN}{CRSR LF}{CTRL
    2} {CRSR DN}{CRSR LF}{CTRL
    8} {CRSR DN}{CRSR LF}{COMD
    3} {CRSR DN}{CRSR LF}{COMD
    1} {CRSR DN}{CRSR LF}{CTRL
    3} {CRSR DN}{CRSR LF}{COMD
    2} {CRSR DN}{CRSR LF}{CTRL
    5} {CRSR DN}{CRSR LF}{CTRL
    7} {CRSR DN}{CRSR LF}{COMD
    7} {CRSR DN}{CRSR LF}{CTRL
    4} {CRSR DN}{CRSR LF}{COMD
    6} {CRSR DN}{CRSR LF}{CTRL
    6} {CRSR DN}{CRSR LF}"
                          :REM*73
180 PRINT"{HOME}";:FORT=1TOL:PR
    INT:NEXT:FORT=1TO16 :REM*79
190 PRINTTAB(13)"{COMD 4}@{COMD
    5}@{COMD 8}@{CTRL 2}@{CTRL
    8}@{COMD 3}@{COMD 1}@{CTRL
```

RUN it right: **C-64; color monitor**

```
    3}@{COMD 2}@{CTRL 5}@{CTRL
    7}@{COMD 7}@{CTRL 4}@{COMD
    6}@{CTRL 6}@{COMD 4}@":NEX
  T                          :REM*122
200 GOSUB430                 :REM*21
210 RETURN                   :REM*97
220 REM PRINT LARGE GRID
                             :REM*245
230 SYS679:G=2:GOSUB550:PRINT"{
    HOME}{CRSR DN}"TAB(13)"{CTR
    L 2}128 HUE PALETTE"
                             :REM*132
240 PRINT"{HOME}";:FORT=1TOL:PR
    INT:NEXT:FORT=1TO16 :REM*11
250 PRINTTAB(4)"{COMD 4}@@{COMD
     5}@@{COMD 8}@@{CTRL 2}@@{C
    TRL 8}@@{COMD 3}@@{COMD 1}@
    @{CTRL 3}@@{COMD 2}@@{CTRL
    5}@@{CTRL 7}@@{COMD 7}@@{CT
    RL 4}@@{COMD 6}@@{CTRL 6}@@
    {COMD 4}@@":NEXT     :REM*37
260 GOSUB430                 :REM*81
270 RETURN                   :REM*157
280 REM PRINT COLOR SHADING SCA
    LES SUB                  :REM*70
290 GOSUB230:G=3:PRINT"{HOME}{C
    RSR DN}"TAB(10)"{CTRL 2}COL
    OR SHADING SCALES" :REM*163
300 PRINT"{HOME}{7 CRSR DNs}"
                             :REM*255
310 FORT=1TO9:PRINT"{CTRL 1}{CT
    RL 9}{37 SPACEs}":NEXT
                             :REM*251
320 PRINT"{2 CRSR DNs}{39 SPACE
    s}"                      :REM*17
330 PRINT"{HOME}{3 CRSR DNs}":F
    ORT=1TO4:PRINTTAB(12)"{CTRL
     9}{CTRL 1}{2 SPACEs}":NEXT
                             :REM*21
340 PRINT"{HOME}{3 CRSR DNs}":F
    ORT=1TO4:PRINTTAB(22)"{CTRL
     9}{CTRL 1}{2 SPACEs}":NEXT
                             :REM*9
350 PRINT"{HOME}{3 CRSR DNs}":F
    ORT=1TO4:PRINTTAB(34)"{CTRL
     9}{CTRL 1}{2 SPACEs}":NEXT
                            :REM*203
360 PRINT"{HOME}{16 CRSR DNs}":
    FORT=1TO2:PRINTTAB(22)"{CTR
    L 9}{CTRL 1}{6 SPACEs}":NEX
    T                        :REM*6
370 PRINT"{HOME}{9 CRSR DNs}"TA
    B(6)"{CTRL 1}{CTRL 9}GREY"T
    AB(15)"BROWN"TAB(26)"BLUE-"
                             :REM*69
380 PRINTTAB(26)"{CTRL 9}GREEN"
                             :REM*18
390 PRINT"{HOME}{15 CRSR DNs}"T
    AB(7)"{CTRL 9}GREEN SET 1"T
    AB(29)"{CRSR UP}GREEN"
                             :REM*26
400 PRINTTAB(29)"{CTRL 9}SET 2"
                             :REM*171
410 RETURN                   :REM*42
420 REM PRINT COMMAND WINDOW SU
    B                        :REM*170
430 PRINT:PRINTTAB(11)"{CTRL 2}
    {CTRL 9} F1 {CTRL 0} LARGE
    PALETTE"                 :REM*158
440 PRINTTAB(11)"{COMD 8}{CTRL
    9} F3 {CTRL 0} SMALL PALETT
    E"                       :REM*222
450 PRINTTAB(11)"{COMD 5}{CTRL
    9} F5 {CTRL 0} SHADING SCAL
    ES"                      :REM*215
460 PRINTTAB(11)"{COMD 4}{CTRL
    9} F7 {CTRL 0} EXIT";:RETUR
    N                        :REM*219
470 REM MENU SUB             :REM*9
480 SYS695:POKE198,0:WAIT198,1:
    GETA$                    :REM*13
490 IFA$="{FUNCT 3}"ANDG<>1THEN
    GOSUB130                 :REM*14
500 IFA$="{FUNCT 1}"ANDG<>2THEN
    GOSUB230                 :REM*111
510 IFA$="{FUNCT 5}"ANDG<>3THEN
    GOSUB290                 :REM*233
520 IFA$="{FUNCT 7}"THENPOKE198
    ,0:RETURN                :REM*154
530 GOTO480                  :REM*111
540 REM CLEAR SCREEN SUB
                             :REM*128
550 PRINT"{HOME}";:FORT=1TO21:P
    RINT"{CTRL 9}{CTRL 1}{39 SP
    ACEs}":NEXT              :REM*252
560 RETURN                   :REM*188
570 DATA 11,12,15,1,7,10,8,2,9,
    4,6,14,3,13,5,0          :REM*118
580 REM BACKGROUND RASTER INTER
    RUPT AND SCREEN TOGGLE ML R
    OUTINES                  :REM*220
590 FORT=1TO16:READD:NEXT
                             :REM*239
600 FORU=49152TO49226:READQ:POK
    EU,Q:CK=CK+Q:NEXT        :REM*29
610 IF CK<>8767 THENPRINT"ERROR
     IN DATA LINES 620-660":END
                             :REM*73
620 DATA 120,169,127,141,13,220
    ,169,1,141,26,208,169,50,14
    1,18,208,169,27          :REM*169
630 DATA 141,17,208,169,33,141,
    20,3,169,192,141,21,3,88,96
    ,169,1,141               :REM*244
640 DATA 25,208,174,18,208,224,
    250,240,22,189,80,195,141,3
    3,208,141,32,208         :REM*16
650 DATA 138,24,105,8,141,18,20
    8,104,168,104,170,104,64,16
    9,50,141,18,208          :REM*253
660 DATA 76,49,234           :REM*197
670 CK=0:FORU=679TO710:READQ:PO
    KEU,Q:CK=CK+Q:NEXT :REM*227
680 IF CK<>4206 THENPRINT"ERROR
     IN DATA LINES 690-700":END
                             :REM*74
690 DATA 173,17,208,16,251,169,
    91,141,17,208,169,216,141,2
    2,208,96,173,17          :REM*232
700 DATA 208,16,251,169,27,141,
    17,208,169,200,141,22,208,9
    6                        :REM*142
710 RETURN                   :REM*87
720 REM REDEFINE DITHERING CHAR
    ACTER                    :REM*12
730 POKE56333,127:POKE1,51
                             :REM*226
740 POKE781,9:POKE782,0:POKE90,
    0:POKE91,216:POKE88,0:POKE8
    9,56:SYS41964            :REM*169
750 POKE1,55:POKE56333,129
                             :REM*111
760 POKE12288,170:POKE12289,85:
    POKE12290,170:POKE12291,85:
    POKE12292,170            :REM*191
770 POKE12293,85:POKE12294,170:
    POKE12295,85:POKE53272,29:R
    ETURN                    :REM*25 ■
```

Bull's-Eye!

Are you sharp enough to get the point when you play this tricky C-64 dart game?



By TONY BRANTNER

If you're aiming for a two-player game that's fun and easy to learn, then you're right on target with Bull's-Eye, a computerized dart game for the C-64. A single joystick, plugged into port 2, is shared by both players. If you'd like to practice by yourself, you just take both players' turns.

The dart board is divided into 12 radial sectors, each worth one to 12 points. If you hit one of the rings that cross the sectors, you'll compound your sector score. The yellow-and-green outer ring doubles the score; the yellow-and-black inner ring triples it. The red bull's-eye is worth 50 points, while the black ring that immediately surrounds it is worth 25. You get nothing for hitting the black outer edge.

Throwers alternate turns, with each turn consisting of three throws. The dart is always moving on the diagonal, but you can relocate it to some extent with the joystick lever. A little practice will give you the feel of the dart's path. When it's a little below your aiming point, release it by pressing the fire-button. At the instant you "throw" it, the dart moves straight *up* about an inch on the screen before the hit—depicted by a little cross—is registered.

To win, you must be the first player to accumulate *exactly* 301 points. The scores for both players, initially 301, are displayed in boxes to the right and left of the board. As play proceeds, both scores decrease. To win, you must make a final hit that brings your score precisely to zero. If you go below zero, you "break," and your score reverts to what it was at the start of your last turn.

Type in Bull's-Eye from Listing 1, using *RUN*'s Checksum program to catch any typing errors. Then be sure to save it to disk before running it. Ⓡ

Tony Brantner, a carpenter by trade and a self-taught computer programmer, enjoys using the C-64 particularly for its graphics capabilities.

Listing 1. Bull's-Eye program. (Available on ReRUN disk. See order card facing page 24.) When entering this listing, be certain that you type in the spaces between any Control and Commodore key commands in lines 420–440, 490–560 and 580–590. For example, in line 420, beginning with {CTRL 9}. . ., you'd first hold down the Commodore key, press the 9 key, release both keys, press and release the space bar, then hold down the control key, press the 0 key, and so on.

```
10 REM BULLSEYE - T. BRANTNER
                              :REM*72
20 POKE53280,0:POKE53281,0:PRIN
   TCHR$(8)CHR$(142)"{SHFT CLR}
   "                          :REM*198
30 FORA=832TO1022:READZ:POKEA,Z
   :NEXT                      :REM*228
40 FORA=49152TO49259:READZ:POKE
   A,Z:NEXT                   :REM*246
50 DIMSE%(13,18),QT(3,14),SC(1)
                              :REM*25
60 FORA=0TO13:FORZ=0TO18:READSE
   %(A,Z):NEXT:NEXT           :REM*200
70 FORA=0TO3:FORZ=0TO3:READQT(A
   ,Z):QT(A,4+Z)=QT(A,Z)*2:QT(A
   ,8+Z)=QT(A,Z)*3            :REM*12
80 NEXT:QT(A,12)=25:QT(A,13)=50
   :NEXT                      :REM*121
90 TC=646:SP=2040:V=53248:S1=54
   272:J2=56320:A=RND(-TI)
                              :REM*174
100 POKEV+16,0:POKEV+28,7:POKEV
   +37,11:POKEV+38,12         :REM*79
110 SC(0)=301:SC(1)=301:REM*131
120 PL=0:POKEV+21,0:POKE53265,1
   1:GOSUB420:POKE53265,27
                              :REM*225
```

RUN it right: **C-64; joystick**

ILLUSTRATED BY SARA ANDERSON

```
13Ø DN=2:CS=SC(PL):POKEV+1,Ø:PO
     KEV+3,Ø:POKEV+5,Ø:POKEV+21,
     7                    :REM*173
14Ø CY=4:IFPLTHENCX=3:GOSUB4ØØ:
     PRINT"{3 SPACEs}":PRINTTAB(
     CX)"{3 SPACEs}"      :REM*224
15Ø POKETC,6+PL*7:CX=3+PL*31:GO
     SUB4ØØ:PRINT"{COMD K}{CTRL
     9}{SHFT B}{COMD F}{CRSR DN}
     {3 CRSR LFs}{COMD C}{SHFT B
     }{COMD I}"           :REM*144
16Ø GOSUB27Ø:CY=13-DN:CX=3+PL*3
     1:A=PV:GOSUB39Ø:CS=CS-PV
                          :REM*6
17Ø CY=15:IFCS<ØTHENCX=2+PL*31:
     GOSUB4ØØ:PRINT"{CTRL 2}BROK
     E":GOTO21Ø           :REM*17Ø
18Ø CX=3+PL*31:A=CS:GOSUB39Ø:IF
     CS=ØTHEN23Ø          :REM*87
19Ø DN=DN-1:IFDN>-1THEN16Ø
                          :REM*239
2ØØ SC(PL)=CS             :REM*163
21Ø FORA=1TO15ØØ:NEXT:PL=PL+1:I
     FPL<2THEN13Ø         :REM*97
22Ø GOTO12Ø               :REM*3Ø
23Ø CY=23:CX=11:GOSUB4ØØ:POKETC
     ,(PEEK(TC)AND7)+1    :REM*113
24Ø PRINT"WINNER: PLAYER "MID$(
     "ONETWO",1+PL*3,3) :REM*1Ø6
25Ø PRINTTAB(8)"PRESS FIRE TO P
     LAY AGAIN";:IFPEEK(J2)AND16
     THEN23Ø              :REM*7
26Ø GOTO11Ø               :REM*65
27Ø POKESP+DN,13:POKEV+39+DN,6+
     PL*7                 :REM*41
28Ø POKE2,173:POKE3,141:POKE4,R
     ND(1)*2:POKE5,RND(1)*2:POKE
     6,DN                 :REM*175
29Ø SYS49152:XP=PEEK(2):YP=PEEK
     (3)                  :REM*191
3ØØ GOSUB41Ø:POKES1+5,153:POKES
     1+4,16:POKES1+4,17   :REM*153
31Ø FORA=ØTO23:POKESP+DN,13+A/1
     1:POKEV+1+DN*2,YP-A:POKES1+
     1,14Ø-A              :REM*122
32Ø FORZ=1TO1Ø:NEXT:NEXT:REM*44
33Ø GOSUB41Ø:POKES1+5,3:POKES1+
     1,1Ø:POKES1+4,16:POKES1+4,1
     7:YP=YP-23           :REM*214
34Ø PV=Ø:X%=(XP-98)/4:Y%=(YP-85
     )/4                  :REM*133
35Ø IFX%<ØORX%>37ORY%<ØORY%>27T
     HENRETURN            :REM*134
36Ø A=Ø:IFX%>18THENA=1:X%=37-X%
                          :REM*237
37Ø IFY%>13THENA=A+2:Y%=27-Y%
                          :REM*89
38Ø Z=SE%(Y%,X%):PV=QT(A,Z):RET
     URN                  :REM*76
39Ø GOSUB4ØØ:PRINT"{CTRL 2}"RIG
     HT$(" "+STR$(A),3):RETURN
                          :REM*192
4ØØ POKE214,CY-1:PRINT:PRINTTAB
     (CX);:RETURN         :REM*135
41Ø FORA=S1TOS1+23:POKEA,Ø:NEXT
     :POKES1+24,15:RETURN
                          :REM*157
42Ø PRINT"{SHFT CLR}{7 SPACEs}{
     CTRL 3}{COMD C}{CTRL 9} {CT
     RL Ø}{SHFT P}{COMD G}{CTRL
     9} {CTRL Ø} {COMD K}{CTRL 9
     } {CTRL Ø}{2 SPACEs}{CTRL 9
     } {CTRL Ø} {SHFT K}{CTRL 9}
      {CTRL Ø}{COMD Y}{2 SPACEs}
     {CTRL 9} {CTRL Ø}{COMD Y} {
     CTRL 9}{COMD M}{CTRL Ø}{COM
     D N}{COMD K}{CTRL 9} {CTRL
     Ø}{COMD Y}"          :REM*81
43Ø PRINT"{8 SPACEs}{COMD 1}{CT
     RL 9} {CTRL Ø}{COMD Y}{COMD
      K}{CTRL 9} {CTRL Ø} {COMD
     K}{CTRL 9} {CTRL Ø}{2 SPACE
     s}{CTRL 9} {CTRL Ø}{2 SPACE
     s}{COMD Y}{SHFT P}{COMD K}{
     COMD V}{CTRL 9} {CTRL Ø}{CO
     MD Y} {COMD Y}{SHFT P}{COMD
      K}{CTRL 9} {CTRL Ø}{COMD Y
     }"                   :REM*194
44Ø PRINT"{7 SPACEs}{CTRL 8}{CO
     MD C}{CTRL 9}{2 COMD Is}{CT
     RL Ø}{COMD V}{CTRL 9}{2 COM
     D Is}{CTRL Ø}{COMD V}{CTRL
     9}{2 COMD Is}{CTRL Ø}{COMD
     V}{CTRL 9}{2 COMD Is}{CTRL
     Ø}{COMD V}{CTRL 9}{2 COMD I
     s}{CTRL Ø}{COMD V} {CTRL 9}
     {2 COMD Is}{CTRL Ø}{COMD V}
     {CTRL 9}{2 COMD Is}{CTRL Ø}
     {COMD V}{CTRL 9}{2 COMD Is}
     {CTRL Ø}{COMD V}"  :REM*15Ø
45Ø PRINT"{7 SPACEs}{COMD 8}{CO
     MD L}{CTRL 9}{1Ø SPACEs}{4 ►
```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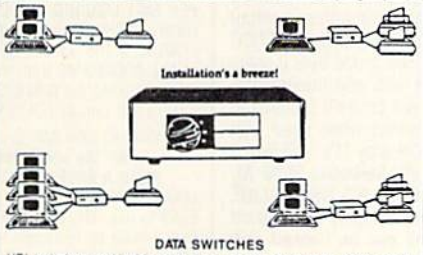

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Connects standard modems or RS 232 accessories to the C64, C128, 64C, SX64, VIC20, or Plus4.

SERIAL PRINTER INTERFACE **$64.95**
Use a standard RS232 type printer on the Commodore. Connects to Serial Bus (6 pin).

IBM to CBM Adaptor **$37.95**
Now use your C64 compatible printer on a PC compatible. Includes a specially designed cable and software.

Reset Button for C64	$8.95
Disk Notcher	$4.49
Dust Cover, C64, Vic-20	$5.95
Dust Cover, 1541	$5.95
Dust Cover, C128 or 1571	$6.95
Mouse Mat	$5.95
Disk Sleeves, 100 pack	$7.95
Joystick Rapid Fire	$5.95
Aprospand 64	$26.95
Cartridge Port Extension, 12 in	$19.95

MODEM LINK, RS232 Interface $15.95
interfaces a Hayes compatible modem to C64, 64C, C128 or 128D. Full plastic case, 3 x 1½.

VSI 3641 S.W. Evelyn, Portland, OR 97219, Shipping $3.00, VISA, MC, money orders accepted. Price & stock, subject to change.

BULL'S-EYE!

```
    COMD Ps}{1Ø SPACEs}{CTRL Ø}
    {COMD J}"              :REM*48
46Ø PRINT"{7 SPACEs}{COMD L}{CT
    RL 9}{6 SPACEs}{COMD D}{COM
    D I}{CTRL Ø}{3 SPACEs}{CTRL
     2}12{3 SPACEs}{COMD 8}{CTR
    L 9}{COMD I}{COMD F}{6 SPAC
    Es}{CTRL Ø}{COMD J}":REM*74
47Ø PRINT"{7 SPACEs}{COMD L}{CT
    RL 9}{4 SPACEs}{COMD D}{CTR
    L Ø}{COMD V}{CTRL 2}1{2 SPA
    CEs}{CTRL 8}{6 COMD Is}{2 S
    PACEs}{CTRL 2}8{COMD 8}{COM
    D C}{CTRL 9}{COMD F}{4 SPAC
    Es}{CTRL Ø}{COMD J}"
                          :REM*1Ø6
48Ø PRINT"{7 SPACEs}{COMD L}{CT
    RL 9}{3 SPACEs}{CTRL Ø}{COM
    D V}{3 SPACEs}{COMD 6}{COMD
     I}{CTRL 9}{COMD I}{CTRL 2}
    {CTRL Ø}{COMD F}{4 SPACEs}{
    COMD D}{COMD 6}{CTRL 9}{COM
    D I}{CTRL Ø}{COMD I}{3 SPAC
    Es}{COMD 8}{COMD C}{CTRL 9}
    {3 SPACEs}{CTRL Ø}{COMD J}"
                          :REM*41
49Ø PRINT" {COMD L}{5 COMD Us}{
    CTRL 9}{SHFT B}{2 SPACEs}{C
```

Can you hit the bull's eye?

```
    TRL Ø}{COMD V}{2 SPACEs}{CT
    RL 8}{COMD I}{COMD 6}{CTRL
    9}{COMD I}{CTRL 2}{CTRL Ø}{
    COMD I}{CTRL 9} {COMD C}{CT
    RL Ø}{4 SPACEs}{CTRL 9}{COM
    D V} {CTRL Ø}{COMD I}{COMD
    6}{CTRL 9}{COMD I}{CTRL 8}{
    CTRL Ø}{COMD I}{2 SPACEs}{C
    OMD 8}{COMD C}{CTRL 9}{2 SP
    ACEs}{SHFT B}{CTRL Ø}{5 COM
    D Us}{COMD J}"         :REM*28
```

```
5ØØ PRINT" {COMD L} {CTRL 2}ONE
     {COMD 8}{CTRL 9}{SHFT B} {
    CTRL Ø}{COMD V}{CTRL 2}5 {C
    TRL 8}{CTRL 9}{COMD V}{CTRL
     Ø}{COMD V}{CTRL 2}{CTRL 9}
    {COMD I}{2 SPACEs}{COMD I}{
    CTRL 8}{CTRL Ø}{COMD D}{2 C
    OMD Is}{COMD F}{CTRL 2}{CTR
    L 9}{COMD I}{2 SPACEs}{COMD
     I}{CTRL 8}{CTRL Ø}{COMD C}
    {CTRL 9}{COMD C}{CTRL Ø} {C
    TRL 2}4{COMD 8}{CTRL 9}{COM
    D K} {SHFT B}{CTRL Ø} {CTRL
     2}TWO {COMD 8}{COMD J}"
                          :REM*39
51Ø PRINT" {COMD L}{5 SHFT Fs}{
    CTRL 9}{SHFT B}{COMD D}{CTR
    L Ø}{2 SPACEs}{CTRL 8}{CTRL
     9}{COMD K}{CTRL Ø}{COMD G}
    {2 SPACEs}{CTRL 2}{COMD C}{
    COMD D}{CTRL 9}{COMD V}{CTR
    L Ø}{COMD K}{2 SPACEs}{CTRL
     9}{COMD K}{COMD C}{CTRL Ø}
    {COMD F}{COMD V}{2 SPACEs}{
    CTRL 8}{COMD M}{COMD K}{2 S
    PACEs}{COMD 8}{CTRL 9} {SHF
    T B}{CTRL Ø}{5 SHFT Fs}{COM
    D J}"                 :REM*112
```


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Introducing the world's first **FULL COLOR!** video digitizer for the Commodore C-64, 64-C, C-128 & 128-D computer. **VIDEO BYTE** can give you digitized video from you V.C.R., LASER DISK, B/W or COLOR CAMERA or OFF THE AIR or CABLE VIDEO (thanks to a fast! 2.2 sec. scan time). New version 3.0 software features full RE-DISPLAY with MULTI CAPTURE MODE, MENU SELECT PRINTING, EXPANDED COLORIZING FEATURES, SAVE to DISK feature and much more!

FULL COLORIZING! Is possible, due to a unique SELECT and INSERT color process, where you can select one of 15 COLORS and insert that color into one of 4 GRAY SCALES. This process will give you over 32,000 different color combinations to use in your video pictures. **SAVES as KOALAS!** Video Byte II allows you to save all your pictures to disk as FULL COLOR KOALA'S. After which (using Koala or suitable program) you can go in and redraw or color your V.B. pic's. **LOAD and RE-DISPLAY!** Video Byte II allows you to load and re-display all Video Byte pictures from inside Video Byte's menu. **MENU DRIVEN!** Video Byte II comes with easy to use menu driven UTILITY DISK with V3.0 digitizer program. (64 MODE ONLY). **COMPACT!** Video Byte II's hardware is compact! In fact no bigger than your average cartridge! Video Byte comes with it's own cable. **INTEGRATED!** Video Byte II is designed to be used with or without EXPLODE! V5.0 color cartridge. Explode! V5.0's menu will return you to VIDEO BYTE II's menu. EXPLODE! V5 is the **PERFECT COMPANION!** Video Byte II users are automatically sent **FREE SOFTWARE** updates along with new documentation, when it becomes available. **PRINT!** Video Byte II will printout pictures in BLACK and WHITE GRAY SCALE to most printers. However when used with Explode! V5.0 your printout's can be done IN FULL COLOR 8 by 11's SIDEWAYS on the **RAINBOW NX-1000, RAINBOW NX-1000C, JX-80, Seikosha 3000 AI. (OKIDATA 10/20's (print larger 6" by 9") USER SLIDE SHOW program w/auto or manual display is standard with VIDEO BYTE program. And can be backed up!)**

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The **MOST POWERFUL, DISK DRIVE and PRINTER CARTRIDGE** ever produced for the COMMODORE USER. Super **USER FRIENDLY** with all the features most asked for.

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BULL'S-EYE!

```
52Ø PRINT" {COMD L}{5 SPACEs}{C
    TRL 9}{SHFT B}{CTRL Ø}{COMD
     V}{2 SPACEs}{CTRL 8}{CTRL
    9}{COMD N}{CTRL Ø}{2 SPACEs
    }{COMD D}{CTRL 9}{COMD D}{C
    TRL Ø} {CTRL 2}{CTRL 9}{COM
    D F} {CTRL Ø}{2 SPACEs}{CTR
    L 9} {COMD D}{CTRL Ø} {CTRL
     8}{CTRL 9}{COMD F}{CTRL Ø}
    {COMD F}{2 SPACEs}{CTRL 9}{
    COMD H}{CTRL Ø}{2 SPACEs}{C
    OMD 8}{CTRL 9}{COMD K}{SHFT
     B}{CTRL Ø}{5 SPACEs}{COMD
    J}"                    :REM*75
53Ø PRINT" {COMD L}{5 SPACEs}{C
    TRL 9}{SHFT B}{CTRL Ø}{2 SP
    ACEs}{COMD 6}{CTRL 9}{COMD
    K}{CTRL 2}{COMD G} {COMD C}
    {CTRL Ø}{COMD D}{COMD I}{2
    SPACEs}{COMD C}{COMD V}{COM
    D C}{COMD V}{2 SPACEs}{COMD
     I}{COMD F}{CTRL 9}{COMD V}
     {COMD M}{COMD 6}{CTRL Ø}{C
    OMD K}{2 SPACEs}{COMD 8}{CT
    RL 9}{SHFT B}{CTRL Ø}{5 SPA
    CEs}{COMD J}"          :REM*167
54Ø PRINT" {COMD L}{5 SPACEs}{C
    TRL 9}{SHFT B}{CTRL 2}{CTRL
     Ø}11{COMD 6}{CTRL 9}{COMD
    K}{CTRL 2}{COMD G}{2 SPACEs
    }{COMD K}{3 SPACEs}{CTRL Ø}
    {COMD K}{CTRL 3}{CTRL 9}{CO
    MD K}{CTRL Ø}{COMD K}{CTRL
    2}{CTRL 9}{COMD K}{3 SPACEs
    }{CTRL Ø}{COMD K}{CTRL 9}{2
     SPACEs}{COMD M}{COMD 6}{CT
    RL Ø}{COMD K}{CTRL 2}9 {COM
    D 8}{CTRL 9}{SHFT B}{CTRL Ø
    }{5 SPACEs}{COMD J}"
                           :REM*114
55Ø PFINT" {COMD L}{5 SPACEs}{C
    TRL 9}{SHFT B}{CTRL Ø}{2 SP
    ACEs}{COMD 6}{CTRL 9}{COMD
    K}{CTRL 2}{COMD G} {COMD D}
    {CTRL Ø}{COMD C}{CTRL 9}{CO
    MD I}{CTRL Ø}{2 SPACEs}{COM
    D D}{COMD F}{COMD D}{COMD F
    }{2 SPACEs}{CTRL 9}{COMD I}
    {CTRL Ø}{COMD V}{CTRL 9}{CO
    MD F} {COMD M}{COMD 6}{CTRL
     Ø}{COMD K}{2 SPACEs}{COMD
    8}{CTRL 9}{SHFT B}{CTRL Ø}{
    5 SPACEs}{COMD J}" :REM*25Ø
56Ø PRINT" {COMD L}{5 SHFT Es}{
    CTRL 9}{SHFT B}{CTRL Ø}{COM
    D F}{2 SPACEs}{CTRL 8}{CTRL
     9}{COMD N}{CTRL Ø}{2 SPACE
    s}{COMD C}{CTRL 9}{COMD C}{
    CTRL Ø} {CTRL 2}{CTRL 9}{CO
    MD V} {CTRL Ø}{2 SPACEs}{CT
    RL 9} {COMD C}{CTRL Ø} {CTR
    L 8}{CTRL 9}{COMD V}{CTRL Ø
    }{COMD V}{2 SPACEs}{CTRL 9}
    {COMD H}{CTRL Ø}{2 SPACEs}{
    COMD 8}{COMD D}{CTRL 9}{SHF
    T B}{CTRL Ø}{5 SHFT Es}{COM
    D J}"                  :REM*31
57Ø PRINT" {COMD L}{5 SPACEs}{C
    TRL 9}{SHFT B}{COMD C}{CTRL
     Ø}{2 SPACEs}{CTRL 8}{CTRL
    9}{COMD K}{CTRL Ø}{COMD G}{
    2 SPACEs}{CTRL 2}{COMD D}{C
    OMD C}{CTRL 9}{COMD F}{CTRL
     Ø}{COMD K}{2 SPACEs}{CTRL
    9}{COMD K}{COMD D}{CTRL Ø}{
    COMD V}{COMD F}{2 SPACEs}{C
    TRL 8}{COMD M}{COMD K}{2 SP
    ACEs}{COMD 8}{CTRL 9}{COMD
    V}{SHFT B}{CTRL Ø}{5 SPACEs
    }{COMD J}"             :REM*172
58Ø PRINT" {COMD L}{5 COMD Os}{
    CTRL 9}{SHFT B} {CTRL Ø}{CO
    MD F}{CTRL 2}2 {CTRL 8}{CTR
    L 9}{COMD F}{CTRL Ø}{COMD F
    }{CTRL 2}{COMD I}{CTRL 9}{2
     SPACEs}{CTRL Ø}{COMD I}{CT
    RL 8}{COMD C}{CTRL 9}{2 COM
    D Is}{CTRL Ø}{COMD V}{CTRL
    2}{COMD I}{CTRL 9}{2 SPACEs
    }{CTRL Ø}{COMD I}{CTRL 8}{C
    OMD D}{CTRL 9}{COMD D}{CTRL
     Ø} {CTRL 2}7{COMD 8}{COMD
    D}{CTRL 9} {SHFT B}{CTRL Ø}
    {5 COMD Os}{COMD J}"
                           :REM*167
59Ø PRINT"{7 SPACEs}{COMD L}{CT
    RL 9}{2 SPACEs}{CTRL Ø}{COM
    D F}{2 SPACEs}{CTRL 8}{CTRL
     9}{COMD I}{COMD 6}{CTRL Ø}
    {COMD I}{CTRL 2}{CTRL 9}{CO
    MD I} {COMD D}{CTRL Ø}{4 SP
    ACEs}{CTRL 9}{COMD F} {COMD
     I}{COMD 6}{CTRL Ø}{COMD I}
    {CTRL 8}{CTRL 9}{COMD I}{CT
    RL Ø}{2 SPACEs}{COMD 8}{COM
    D D}{CTRL 9}{2 SPACEs}{CTRL
     Ø}{COMD J}"           :REM*171
6ØØ PRINT"{7 SPACEs}{COMD L}{CT
    RL 9}{3 SPACEs}{CTRL Ø}{COM
    D F}{3 SPACEs}{COMD 6}{CTRL
     9}{COMD I}{CTRL Ø}{COMD I}
    {CTRL 2}{COMD V}{4 SPACEs}{
    COMD C}{COMD 6}{COMD I}{CTR
    L 9}{COMD I}{CTRL Ø}{3 SPAC
    Es}{COMD 8}{COMD D}{CTRL 9}
    {3 SPACEs}{CTRL Ø}{COMD J}"
                           :REM*128
61Ø PRINT"{7 SPACEs}{COMD L}{CT
    RL 9}{4 SPACEs}{COMD C}{CTR
    L Ø}{COMD F}{CTRL 2}6{2 SPA
    CEs}{CTRL 8}{CTRL 9}{6 COMD
     Is}{CTRL Ø}{2 SPACEs}{CTRL
     2}3{COMD 8}{COMD D}{CTRL 9
    }{COMD V}{4 SPACEs}{CTRL Ø}
    {COMD J}"              :REM*7
62Ø PRINT"{7 SPACEs}{COMD L}{CT
    RL 9}{6 SPACEs}{COMD C}{CTR
    L Ø}{COMD I}{3 SPACEs}{CTRL
     2}1Ø{3 SPACEs}{COMD 8}{COM
    D I}{CTRL 9}{COMD V}{6 SPAC
    Es}{CTRL Ø}{COMD J}"
                           :REM*219
63Ø PRINT"{7 SPACEs}{COMD L}{CT
    RL 9}{1Ø SPACEs}{4 COMD Ys}
    {1Ø SPACEs}{CTRL Ø}{COMD J}
    "                      :REM*23Ø
64Ø CY=1Ø:CX=3:A=SC(Ø):GOSUB39Ø
    :CX=34:A=SC(1):GOTO39Ø ►
```


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		CREDIT CARDS	COD	PRE-PAYMENT
Bulk	5.25 DSDD	$ .19	$ .18	$ .17
Bulk	3.5 DSDD	.55	.53	.41
Bulk	5.25 DSHD	.38	.36	.32
Bulk	3.5 DSHD	1.10	.89	.85
White Box	5.25 DSDD	.26	.25	.24
White Box	3.5 DSDD	.60	.58	.55
White Box	5.25 DSHD	.49	.47	.43
White Box	3.5 DSHD	1.20	1.15	1.12

Sleeves and Labels

Sleeves and Labels are sold in lots (multiples) of 100. The minimum is 1 lot.

		CREDIT CARDS	COD	PRE-PAYMENT
5.25 Paper Sleeves	(100 pack)	$3.00	$2.88	$2.79
5.25 Labels	(100 pack)	3.00	2.88	2.79
3.5 Labels	(100 pack)	3.00	2.88	2.79

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Floppy Controller	Floppy Controller
Mono Monitor	Mono Monitor
Mono Video Card	Mono Video Card
101 keyboard	101 keyboard
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BULL'S-EYE!

```
                                    :REM*40
65Ø DATA Ø,48,Ø,Ø,48,Ø,Ø,48,Ø,Ø
    ,48,Ø,Ø,252,Ø,Ø,236,Ø,Ø,116
    ,Ø,Ø,236,Ø,Ø,116      :REM*50
66Ø DATA Ø,Ø,236,Ø,Ø,116,Ø,Ø,25
    2,Ø,3,187,Ø,14,186,192,58,1
    86,176,58,186         :REM*66
67Ø DATA 176,58,186,176,14,254,
    192,3,51,Ø,Ø,48,Ø,Ø,48,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø      :REM*134
68Ø DATA Ø,Ø,Ø,Ø,Ø,48,Ø,Ø,48,Ø,
    Ø,252,Ø,Ø,236,Ø,Ø,116,Ø,Ø,1
    16,Ø,3,187,Ø,14       :REM*246
69Ø DATA 186,192,58,186,176,1Ø,
    254,128,Ø,48,Ø,Ø,48,Ø,Ø,48,
    Ø,Ø,48,Ø,Ø,Ø,Ø,Ø      :REM*47
7ØØ DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,48,Ø,Ø,48,Ø
    ,Ø,48,Ø,Ø,48,Ø,Ø      :REM*84
71Ø DATA 184,Ø,63,255,24Ø,Ø,184
    ,Ø,Ø,48,Ø,Ø,48,Ø,Ø,48,Ø,Ø,4
    8,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø    :REM*145
72Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,
    Ø,165,6,1Ø,168,165,2,153,Ø,
    2Ø8,165,3,153,1       :REM*154
73Ø DATA 2Ø8,173,Ø,22Ø,17Ø,41,1
    6,2Ø8,1,96,138,74,74,41,3,1
    68,136,192,2,144      :REM*239
74Ø DATA 2,164,4,24,165,2,121,1
    Ø6,192,2Ø1,91,176,7,152,73,
    1,168,76,55,192       :REM*198
75Ø DATA 133,2,132,4,138,41,3,1
    68,136,192,2,144,2,164,5,24
    ,165,3,121,1Ø6        :REM*169
76Ø DATA 192,2Ø1,97,144,4,2Ø1,2
    3Ø,144,7,152,73,1,168,76,91
    ,192,133,3,132,5      :REM*53
77Ø DATA 162,8,16Ø,Ø,2ØØ,2Ø8,25
    3,2Ø2,2Ø8,25Ø,76,Ø,192,1,25
    5,14,14,14,14,14      :REM*127
78Ø DATA 14,14,14,14,14,14,14,1
    4,4,4,4,4,4,14,14,14,14,14,1
    4,14,14,14,14,14      :REM*167
79Ø DATA 14,5,5,Ø,Ø,Ø,Ø,Ø,Ø,14,
    14,14,14,14,14,14,14,5,5,5
    ,1,1,1,Ø,Ø,Ø,Ø,Ø      :REM*188
8ØØ DATA 14,14,14,14,14,14,14,5
    ,5,1,1,1,1,1,Ø,Ø,Ø,Ø,Ø,14,1
    4,14,14,14,6,6,1      :REM*197
81Ø DATA 1,1,1,1,1,1,1,Ø,Ø,Ø,Ø,Ø,
    14,14,14,14,6,6,2,1,1,1,1,1
    ,1,1,1,Ø,Ø,Ø,Ø        :REM*255
82Ø DATA 14,14,14,6,6,2,2,2,2,1
    ,1,1,1,9,9,9,8,8,8,14,14,6,
    2,2,2,2,2,2,2,1       :REM*2Ø6
83Ø DATA 9,9,9,1,1,Ø,Ø,Ø,14,14,
    6,2,2,2,2,2,2,2,2,9,1,1,1,1
    ,Ø,Ø,Ø,14,6,2,2       :REM*51
84Ø DATA 2,2,2,2,2,1Ø,1Ø,2,2,1,
    1,1,1,Ø,Ø,14,6,2,2,2,2,2,2,
    1Ø,1Ø,2,2,2,2,1       :REM*65
85Ø DATA 1,1,Ø,Ø,7,3,3,3,3,3,2,
    2,1Ø,2,2,2,2,2,2,2,1,1,Ø,7,
    3,3,3,3,3,3,11,3      :REM*245
86Ø DATA 3,3,2,2,2,2,2,2,2,12,12,
    7,3,3,3,3,3,3,3,11,3,3,3,3,3,
    3,3,3,12,12,13        :REM*73
87Ø DATA 12,1,5,11,12,8,4,9,1Ø,
    6,2,11,1Ø,3,7,9       :REM*25 ■
```

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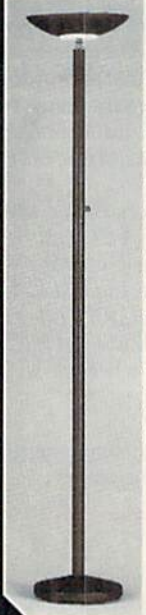

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Escape Hatch 128

Now you can toggle between two windows in both 40- and 80-Column modes.

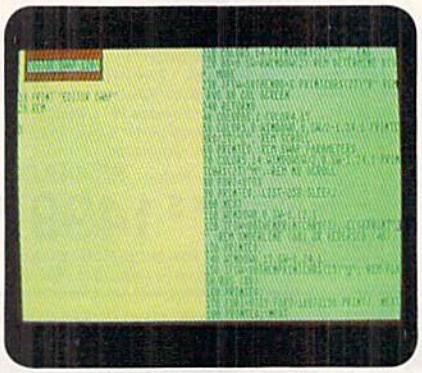
By RICHARD CURCIO

One of the best features of the C-128 is its screen editor. Editor Swap offers significant enhancements to the screen editor and its windowing capabilities by adding a new command—Escape £. The program in Listing 1 is a Basic loader that pokes the Editor Swap machine language into memory.

Type in the listing, using *RUN*'s Checksum program to detect any typing errors, and be sure to save it to disk before running it. When run, the loader displays the range of memory the machine language occupies.

Editor Swap gives the C-128 an additional escape function, executed by pressing the escape key and then the £ key (Escape £), or by including PRINT CHR$(27) "£" in a 128-mode program. This function is similar to Escape X, which toggles the C-128 between 40- and 80-Column modes.

However, this command swaps editor values without switching display modes. It allows you to jump between windows in 40-Column mode, switch to 80 columns and do the same thing, and then return to 40 columns and find the windows still intact. To disable the function, press the run-stop/restore key combination.



Editor Swap's split-screen display.

The Demo

After you run the demo program in Listing 2, it adjusts itself to 40 or 80 columns and assigns the escape-key code, CHR$(27), plus £ to variable E$. Then it creates a window in the left half of the screen, prints E$, changes the character color and opens a window in the right half of the screen. Next, it jumps from the right side to the left, listing itself where the previous list operation ended. The Sleep command slows things down for observation. Note that Escape L is printed in the left window and Escape M in the right, so the left window scrolls while the right does not.

The demo also creates upper and lower windows in different colors, flashing and underlining in 80-Column mode, and prints inside the windows some numbers that show these attributes. Again, one window scrolls while the other doesn't.

In 80-Column mode, entering CHR$(27)"R" (Escape R) reverses the entire screen, and clearing the windows with a different color cursor creates two different backgrounds. Underlined and flashing characters are available *only* in 80 columns.

If you wish to use a character other than £, enter POKE ES+24, followed by the CHR$ value of the character you want to use. Appendix E in your *C-128 System Guide* lists the CHR$ codes. If you want to use one that's not listed, enter PRINT ASC (x), where x is the desired character. R

Richard Curcio has had many programs published in a variety of magazines.

Listing 1. Editor Swap 128 Basic loader. (Available on ReRUN disk. See order card facing page 24.)

```
5 REM EDITOR SWAP 128 - RICHARD
   CURCIO                :REM*180
10 ES=4864:REM RELOCATEABLE
                         :REM*213
20 BANK15:FORI=0TO172:READ:POK
   EES+I,D:NEXT          :REM*47
30 X=ES+28:GOSUB100:POKEES+7,LB
   :POKEES+8,HB          :REM*185
40 X=ES+29:GOSUB100:POKEES+10,L
   B:POKEES+11,HB        :REM*60
50 X=ES+23:GOSUB100:POKEES+13,L
   B:POKEES+15,HB        :REM*136
60 X=ES+91:GOSUB100:POKEES+31,L
   B:POKEES+33,HB        :REM*238
70 PRINT"EDIT-SWAP INSTALLED"ES
   "TO"ES+172            :REM*75
80 PRINT"SYS"ES"TO ENABLE"
                         :REM*192
90 SYS ES:END            :REM*230
100 HB=X/256:LB=X-INT(X/256)*25
    6:RETURN             :REM*59
110 DATA 173,56,3,172,57,3,141,
    28,19,140,29,19,169,23,160,
    19,141,56,3,140      :REM*38
120 DATA 57,3,96,201,92,240,3,7
    6,255,255,169,91,162,19,36,
    215,16,6,24,105      :REM*216
130 DATA 41,144,1,232,133,206,1
    34,207,160,25,177,206,182,2
    24,153,224,0,138     :REM*91
140 DATA 145,206,136,16,243,24,
    165,206,105,26,133,206,144,
    2,230,207,160,13     :REM*176
150 DATA 177,206,190,84,3,153,8
    4,3,138,145,206,136,16,242,
    96,0,4,0,216,24      :REM*210
160 DATA 0,0,39,0,0,5,0,0,24,39
    ,88,43,13,13,0,0,0,0,0,0,0,0,
    0,128,128,128        :REM*236
```

RUN it right: **C-128**

```
17Ø DATA 128,128,128,128,128,12
    8,128,Ø,Ø,Ø,Ø,Ø,Ø,Ø,8,24,Ø,
    Ø,79,Ø,Ø,Ø,Ø,Ø      :REM*113
18Ø DATA 24,79,88,43,7,7,Ø,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø,128,128,128,128,1
    28,128,128,128       :REM*22
19Ø DATA 128,128,Ø,Ø,Ø,Ø:REM*35
```

Listing 2. Demo program. (Available on ReRUN disk. See order card facing page 24.)

```
1Ø REM EDITOR SWAP DEMO LISTING
    2                    :REM*5
2Ø E$=CHR$(27)+"{LB.}" :REM*125
3Ø GOSUB22Ø              :REM*1Ø3
4Ø COLORBG,1:COLOR4,15   :REM*4
5Ø COLOR5,8:WINDOWØ,Ø,SW/2-1,24
   ,1:PRINTCHR$(27)"L";:REM SCR
   OLL                   :REM*64
6Ø PRINTE$;:REM SWAP PARAMETERS
                         :REM*159
7Ø COLOR5,14:WINDOWSW/2,Ø,SW-1,
   24,1:PRINTCHR$(27)"M";:REM N
   O SCROLL              :REM*74
8Ø FORI=ØTO3             :REM*151
9Ø PRINTE$;:LIST-25Ø:SLEEP2
                         :REM*1Ø3
1ØØ NEXT                 :REM*23Ø
11Ø WINDOWØ,Ø,SW-1,12,1:REM*222
12Ø IFSW=8ØTHENPRINTCHR$(2);:EL
    SEPRINT"{CTRL 9}";:REM UNDE
    RLINE (8Ø) OR REVERSED (4Ø)
                         :REM*84
13Ø PRINTE$;             :REM*255
14Ø WINDOWØ,13,SW-1,24,1
                         :REM*254
15Ø IFSW=8ØTHENPRINTCHR$(15)"{C
    TRL 9}";:REM FLASH/RVS (8Ø)
                         :REM*18
16Ø PRINTE$;             :REM*24
17Ø FORI=ØTO9:FORJ=1ØØTO15Ø:PRI
    NTJ,:NEXT            :REM*178
18Ø PRINTE$;:NEXT        :REM*9Ø
19Ø SLEEP2               :REM*1Ø6
2ØØ FORI=ØTO1:PRINTCHR$(27)"L";
    E$:NEXT              :REM*155
21Ø COLOR5,14:PRINTCHR$(27)"@";
    :END                 :REM*182
22Ø BG=Ø:SW=RWINDOW(2):REM DETE
    RMINE DISP. MODE     :REM*66
23Ø IFSW=8ØTHENBG=6:PRINTCHR$(2
    7)"R":REM RVS 8Ø COL SCREEN
                         :REM*171
24Ø RETURN               :REM*127
```

■

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By LOUIS F. SANDER

INFILTRATOR: This will help you reach the enemy command center. Once you're in the helicopter, press keys B, S and I. When the engine has enough power for takeoff, pull the stick back and leave the ground. Press the asterisk key, and your screen will change. Press the A key; when the cursor appears, type 72.8 and press the space bar to return to the helicopter screen. Travel at 6000 meters in the compass direction.

Press the R key to enable your rockets and, when the enemy attacks, get his plane in your helicopter's middle screen. To destroy him, keep him in this position while you're firing. If he fires at you, press the F key and hit the firebutton to drop a flare, then turn your helicopter to escape enemy rockets.

When you've destroyed both fighter planes, press the R key to disable your rockets, and follow your compass. When it starts to rotate, press the firebutton and pull your joystick backward. The helicopter will slow down and stop.

Release the firebutton and push the joystick forward. Your helicopter will lose altitude. When you've reached 200 meters, press the W key and land slowly in the enemy command center. (If you fail to press W, the enemy will catch you landing!)

—XAVIER JOHN
BOROKO, PAPUA, NEW GUINEA

NEUROMANCER: To get to see Lupus, enter the SEA base and use the password LONGISLAND. Edit the warrants and use Larry Moe's name as one of the offenders. He'll be arrested, and you can walk right into the Panther Moderns. Ask him about Sense/Net, and he'll sell you a security pass. Also ask about Bank Gemeinschaft.

Buy a gas mask from Julius Deane. It lets you enter Maas Biolabs (without getting killed) after you disable the security system from cyberspace.

If you break and kill the AI for Bank Gemeinschaft, you can get $500,000. To kill an AI, use the Psychoanalysis skill to see its weakness. Use that skill first, then follow up with Sophistry, Logic and the others. Zen takes all damage down to zero.

You can use a track-and-sector editor to find all the passwords for all of the bases. An effective method of cracking a base is to use: Ice Breaking skill; SLOW (5 is best); a virus like Thunderhead; cracking software like LogicBomb or DepthCharge; ArmorAll to decrease your damage. Finally, *never* sell your body parts! If you do, you'll get crushed in cyberspace.

—BUFORD T. JUSTICE
TEXARKANA, TX

OUTRUN: Here's how to get unlimited time: After you've selected your road, the computer will load the main games module, then you'll see the radio with the music playing. At this point, you normally select the music and press the firebutton to start. But if your computer has a reset button, press it now and enter these lines: POKE 34999,173 <return> SYS 38371 <return>. You'll end up back at the radio. Now press the firebutton, and you're off with unlimited time!

—JACQUES FISET
PREVOST, QUEBEC, CANADA

RED STORM RISING: If a torpedo begins to circle you, stay at the exact center of its search circle, which is its blind spot. If the control wire's still intact after a Mark 48 becomes active, you can then control the torpedo by changing the search pattern from right to left and back, making an "S" path similar to that of the Russians'.

—TED ROBERSON
LADSON, SC

SPORTING NEWS BASEBALL: When pitching, select the curveball by pushing the joystick toward the batter. During the pitch, pull down so the ball sinks. If the batter hits it, he will almost always hit a ground ball for an easy out.

Also, though they do not appear on the scorecard, errors do happen. Occasionally an outfielder will overthrow an infielder, allowing the runner to take an extra base. So when you get a single, always round first base by a couple of steps; if you draw a throw from the outfield, you might get a throwing error and the chance for an extra base.

—MIKE MCDERMOTT
TUCSON, AZ

TECHNOCOP: When you use the machine gun while driving your VMAX to the crime scene, shoot the very rightmost edge of the enemy cars. It takes less time to destroy them this way.

While you're searching for the head thug in a building, many other thugs will try to stop you. When they come at you, squat and open fire with your .88 Magnum, and they will not hit you.

Finally, don't worry about using up your machine gun or cannon ammunition, because you have an unlimited amount.

—MIKE CHATEL
ADDRESS UNKNOWN

THUNDER BLADE: When attacking tanks or low-flying enemy helicopters, hover your helicopter just above the ground, shooting away without increasing your altitude. Then the enemy bombs and missiles never seem to harm you.

—PRINCE PARMER
PRINCE GEORGE, B.C., CANADA

WHERE IN [WHEREVER] IS CARMEN SANDIEGO?: In the first city of your quest, investigate all three buildings, even if one of the early ones tells you where your quarry is headed. This will give you at least two clues about your suspect, and you only need three to get a warrant from the Interpol computer. If you're lucky, you can get the three clues and have the arrest order early in the game.

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COMMODORE CLINIC

Word processing with Spanish character sets; copying files; and printing Basic programs.

By ELLEN RULE

Q *I need a C-128 word processor that writes and prints Spanish-language characters using my Panasonic KX-P1180 printer's foreign character set.*

—W. J. MILLER
SUN CITY WEST, AZ

A Digital Solutions' (20 Wertheim Court, Unit 39, Richmond Hill, Ontario, Canada L4B 3A8) Pocket Writer 3 has foreign language options that let you design a screen character set to correspond to your printer's foreign language set.

You may also use a word processor that has a user-definable graphic font. Xetec's (2804 Arnold Rd., Salina, KS 67401) FontMaster 128 and Berkeley Softworks' (2150 Shattuck Ave., Berkeley, CA 94704) GEOS (with geoWrite and the geoFont editor) let you create characters to match the Spanish set.

Q *When I turn on my 1541-II drive, the drive light sometimes stays on. I must keep turning the drive off and on until the light stays off.*

—JONATHAN CATT
MILWAUKEE, WI

A Your drive is not successfully completing its self-test. You may be suffering from radio frequency interference from the power supply being too close to your 1541-II. Try moving the power supply farther away from the drive.

Or, possibly, an attached component, such as a printer that's not turned on (or is on, but out of paper) might be tying up the serial bus and not allowing the drive to complete its start-up procedure. Unplug as many extra components as possible; if the problem persists, your drive needs testing by a Commodore-authorized repair technician.

Q *I just bought an 80-column monitor for my 128. When I try to use the 80-Column mode with my word processor, the screen remains blank. If I just turn the computer on, the start-up screen comes on, but I can't read what it says. I tried another 128 and the display is fine. Could you explain what is wrong with my 128 and how to fix it? The 40-Column mode works just fine.*

—CHARLES MUHLBAUER
VERGA, NJ

A It's likely that the 80-column graphics chip (8563 Video Controller) or one of its support chips (74LS244 or 4416) is defective. Before you consult a qualified repair technician, run through a quick check of your system.

In order to obtain an 80-column display, set the monitor to RGB-Digital mode and depress the 40/80 key; the 80-column cable must be snugly in place, and the software you are using must work in 128 mode with 80 columns.

Q *How do I get a printed listing of a Basic program?*

—RON GREENLOW
CONCORD, NH

A With the program in memory, just enter:

```
OPEN4,4:CMD4:LIST:PRINT#4:CLOSE4
```

This is what it all means: Open a channel #4 to device #4, which is the printer. The CMD command means "change main device" to 4; now everything that would normally go to the screen will go to the new main device, the printer. LIST sends your Basic program listing to the printer. PRINT#4 clears the channel, and CLOSE4 closes it and changes the main device back to the default device, the screen. This method may also be used to print a disk directory that has been loaded using the LOAD"$",8 command.

Q *I have been asked to produce a club newsletter, and I am thinking of using my son's C-64. Help! I am a novice at the 64. How should I approach the project? Can I include pictures?*

—EVELYN BABINEAU
LINCOLN, NE

A Please, walk before you run! Start out by learning to use a word processor, and print narrow columns that can be manually cut and pasted onto the page. If your word processor doesn't have enlarged character capabilities, use rub-on letters for your headlines. Paste in your pictures with a glue stick.

Once you get the knack of formatting disks, loading and saving files, using your printer, and other aspects of Commodore computing, invest in PaperClip Publisher by Electronic Arts (1820 Gateway Drive, San Mateo, CA 94404) or Berkeley Softworks' (address above) GEOS with geoPublish, either of which will allow you to import text and graphics, format columns and make headlines to create your newsletter documents.

By starting slowly and increasing your knowledge one step at a time, you'll have a more productive and less frustrating computing experience.

Q *I have a C-128 and a 1571 disk drive. I copied files (occupying a little more than 500 blocks) from one disk to a newly formatted double-sided disk with 1328 blocks free. Now both disks show only 162 blocks free. Why the discrepancy?*

—JOHN POTTER
NEW LEXINGTON, OH

A You probably used a 64-mode copier to copy your files, which left your drive in 1541 mode. A disk formatted in 1571 mode will only show a total of 664 blocks when read in 1541 mode. Try setting your drive back to 1571 mode with the command, OPEN15,8,15,"U0>M1", and then list the directory. There should now be a total of 1328 blocks free.

Disk-copying (as opposed to file-copying) a single-sided disk or using the Validate command in 64 mode could have caused the results you describe, in which case the single-sided flag in the disk's BAM would be set to zero. To recover the other (formatted) side of the disk, use a sector editor to set the flag (byte 3, the fourth byte, of track 18, sector 0) back to 1. ■

128 Mode

Here are some tips that can help add years to the life of your 128 system.

By MARK JORDAN

WITH THE C-128 no longer in production, owners of that machine must consider not only preventive measures to avoid system failure, but what to do if failure does occur.

Pro Talk

Obviously, many of the problems that can strike your Commodore system involve electricity: static, lightning and power surges. I recently spoke with Bryan Appel, a Commodore repair specialist from Tektonics Plus, Inc. (150 Houston St., Batavia, IL 60510), about guidelines that may help you reduce these vexations.

Appel stressed that unplugging a system during lightning storms is the *only* guaranteed safeguard against damage. To lessen the risk of static electricity, he offered two simple solutions. One is to keep two joysticks plugged in at all times. This will save the pins from shorting if your hand should accidentally touch the ports while plugging in a joystick (a clear possibility with the 128D). The other tip affords even more protection: Connect one end of a bare length of wire to the cover screw of a nearby grounded outlet and tape the other end to your computer desk. Then get in the habit of touching it each time you sit down to use the computer.

Concerning surge protectors, Appel said, "If you pay less than 100 dollars for one, you're not getting much protection." When I asked him if it made sense to spend 100 dollars protecting a 200 dollar computer, he reminded me that you're protecting an entire system—disk drive, monitor, printer and computer.

In the seven years I've owned Commodore computers, my machines have visited the shop five times—but I'm what you'd consider a "heavy user." Of those five repairs, three could have been prevented if I had heeded the above advice, and the saved expense would have paid for a new computer.

Try Your Hand at Repairs

If you've read this far, it may be because you have a sick computer. Before you start thumbing through the Yellow Pages for a dealer who repairs Commodores, why not see if *you* can fix the problem?

First, I must give the mandatory words of warning: You'll probably void your warranty (if it's still intact), you might run into problems you can't possibly solve (but no harm in looking), and you might make things worse (but not if you're careful).

Two repairs I think you can make yourself are changing a blown fuse and cleaning a dirty keyboard.

Fuse Fix

If your entire system goes out, you might have blown a fuse. First, check the fuse in the power supply. Simply disconnect the power supply, turn it over and use a screwdriver to remove the fuseholder. (In the 128D, the power supply is internal, located inside the console at the left rear.) If the fuse is blown, you'll see the metal strip is severed. Gently remove the fuse and replace it with a duplicate.

The other fuse you should check is inside the computer console near the on/off switch (located near the other one on the 128D). Take the computer apart, locate and examine the fuse, and replace it if necessary.

Key Cures

Problems with keys are a common source of consternation. If a group of keys stops working, it's likely you have a blown CIA chip. Leave that job to the pros. If only one or two keys start to act up, give your 128 a cleaning.

Open your computer—or the keyboard if you have a 128D—and separate the printed circuit board from the key switches. To do so, you'll have to unsolder (and then resolder when you're finished) three pairs of wires that are connected to the bottoms of the shift-lock, caps-lock and no-scroll keys. It isn't difficult, and there's little danger of damaging anything because they come from the back side of the circuit board and are isolated from any sensitive electrical parts.

Next, with a clean, damp rag and a very small bit of liquid soap, gently wash the circuit board. Rinse with a clean, soapless, damp rag.

Cleaning the keys themselves is trickier. On the bottom of each key is a conductive rubber piece with two feet. Depress the keys so that these feet are accessible from the rear, then gently wash them. This rubber piece will flip-flop, so *be careful*.

If a key doesn't travel properly, you may have to do a major cleaning job. Before attempting that, it may help to work the key back and forth and blow into it. If not, it's bath time. Dip the entire keyboard into a bucket of soapy water. After letting it soak overnight, remove it and rinse thoroughly. Then let the keyboard air-dry for three or four days before reassembling. Sound drastic? Bryan Appel assured me that it's a safe procedure, as long as you let it dry *thoroughly* before reusing it.

I haven't tried soaking it, but I have cleaned my keyboard several times, and it's saved me from having to visit the repair shop.

128 Specialists

When your 128's problems are greater than your skills can handle, it's time to have a professional take a look. Even if dealers in your area won't touch a C-128, don't worry—UPS can come to your rescue. There are several companies advertising in *RUN* who do computer repairs through the mail, including Tektonics.

Personally, I prefer having my computer repaired via the mail because it's fast (I once sent in my C-128 on a Monday and had it back on Thursday), it's reliable, and I know how much it's going to cost (most companies charge a flat fee, somewhere in the $55 to $70 range).

Remember, prevention is the cheapest way to go. Home repair is next. And if all else fails, there's UPS. ■

Mark Jordan, a high school English teacher by profession, has been programming Commodore computers since 1983.

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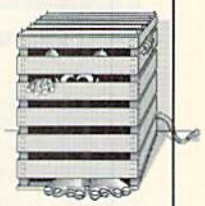

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Circle 73 on Reader Service card.

GEOWATCH

Here's DA-Runner, the master desk accessory that you can use to load almost any other desk accessory on disk.

By JIM COLLETTE

JUST AS YOU ARE READY to paste a few pictures in geoPublish, you realize that you forgot to copy Photo Manager onto your geoPublish disk. You waste time searching for the Photo Manager, and finally waste more time copying it to the work disk.

DA-Runner to the rescue! With this short desk accessory (DA), you can load any *other* DA you want from the first 50 DAs on any disk drive. As an added bonus, color is turned off while the DA runs.

I had implemented this concept in my GEOS Font Editor 2.5, which always lets you pick DAs from different drives, and it worked so well that I developed DA-Runner so it could be employed in other programs.

To use DA-Runner, type in Listing 1, using *RUN*'s Checksum program, and save it to disk. To create the DA-Runner program, place a GEOS-formatted disk containing the application program you will be using in the drive and run Listing 1. Be sure to make it one of the first seven DAs on the disk, so that it will appear when you load a desk accessory within a program.

Then, whenever you need to run a DA, simply select DA-Runner instead of the desk accessory you want to load. When DA-Runner executes, it displays a list of the first 50 DAs on the current disk. The Disk and Drive buttons allow you to change disks and drives, so you can insert various disks. Once you locate the desired desk accessory, click its filename and select the Open icon. Your desk accessory will then be loaded.

When the desk accessory you're using is done, you then need to restore control to the original application. If you removed the disk that DA-Runner was on, you'll be prompted to re-insert it into the appropriate drive. When you do so, control will be returned to the original GEOS program you were using.

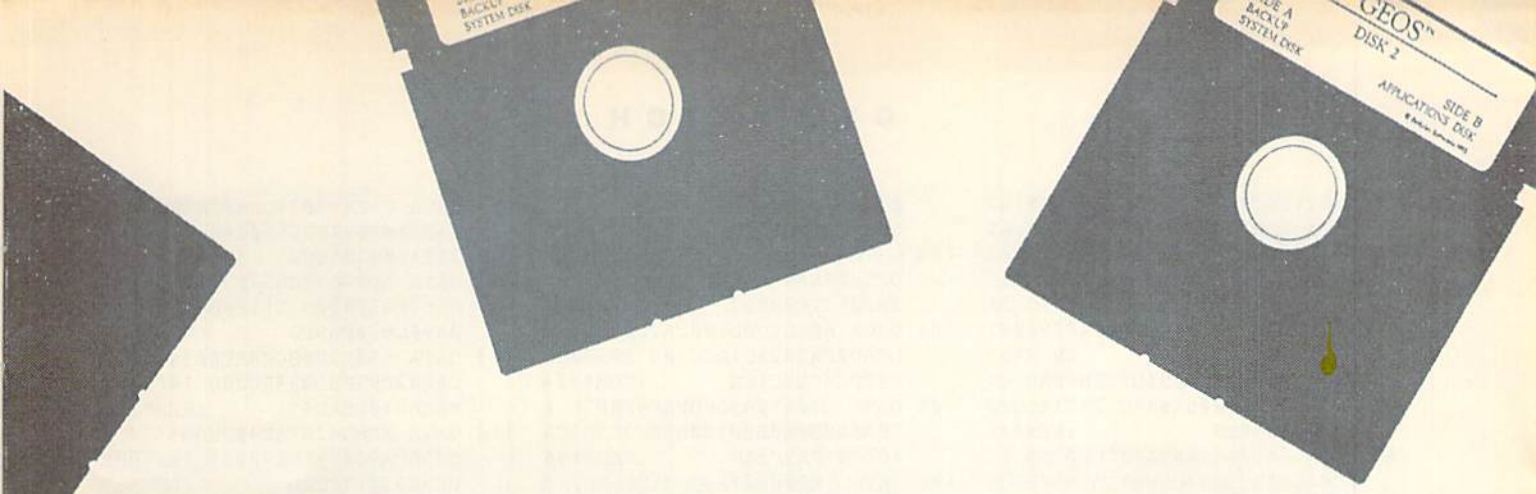
I've tried DA-Runner with many desk accessories, and it has worked well with all. Most important: Don't remove a disk before quitting a desk accessory, for that will usually crash the system. R

Jim Collette, better known as "geoRep Jim" on QuantumLink, is a high school student who contributed several programs to RUN's *recently published GEOS Companion.*

Listing 1. The DA-Runner program creator. (Available on ReRUN disk. See the order card facing page 24.)

```
1 DR=8:FI$="DA-RUNNER":TY$=CHR$
  (5):GOTO9                :REM*113
2 HI=INT(A/256):PRINT#15,"M-R"C
  HR$(A-HI*256)CHR$(HI):REM*25Ø
3 GET#15,A$:A=ASC(A$+CHR$(Ø)):R
  ETURN                    :REM*82
4 PRINT#15,"U1:"2;Ø;TR;SC:RETUR
  N                        :REM*134
5 PRINT#15,"U2:"2;Ø;TR;SC:RETUR
  N                        :REM*254
6 PRINT#15,"B-P:"2;PS:RETURN
                           :REM*77
7 GET#2,A$:A$=LEFT$(A$+CHR$(Ø),
  1):RETURN                :REM*13Ø
8 PRINT#2,CHR$(A);:RETURN
                           :REM*11Ø
9 DIMD$(29):PRINT"WORKING...":O
  PEN3,DR,3,FI$+",U,W"     :REM*179
1Ø READA$:PRINT".";:IFA$="-1"TH
  ENCLOSE3:GOTO15          :REM*97
11 FORI=1TOLEN(A$):IFMID$(A$,I,
  1)=" "THENA$=LEFT$(A$,I-1)+M
  ID$(A$,I+1)              :REM*217
12 NEXT:FORI=1TOLEN(A$)STEP2:H$
  =MID$(A$,I,1):L$=MID$(A$,I+1
  ,1)                      :REM*227
13 H=16*(VAL(H$)-(H$>"@"ANDH$<"
  G")*(ASC(H$)-55))        :REM*192
14 PRINT#3,CHR$(H+(VAL(L$)-(L$>
  "@"ANDL$<"G")*(ASC(L$)-55)))
  ;:NEXT:GOTO1Ø             :REM*132
15 OPEN15,DR,15:OPEN2,DR,2,"#":
  OPEN3,DR,3,FI$:CLOSE3
                           :REM*237
16 A=656:GOSUB2:DB=A:A=66Ø:GOSU
  B2:DE=A:TR=18:SC=DB:GOSUB4
                           :REM*236
17 PS=DE:GOSUB6:FORI=ØTO29:GOSU
  B7:D$(I)=A$:NEXT:TR=ASC(D$(1
  ))                       :REM*189
18 SC=ASC(D$(2)):GOSUB4:GOSUB7:
  XT$=A$:GOSUB7:XS$=A$:GOSUB4
                           :REM*6Ø
19 A=Ø:GOSUB8:A=255:GOSUB8:A=3:
  GOSUB8:A=21:GOSUB8:GOSUB5
                           :REM*14Ø
2Ø D$(19)=D$(1):D$(2Ø)=D$(2):D$
  (1)=XT$:D$(2)=XS$:D$(21)=CHR
  $(Ø):D$(22)=TY$          :REM*56
21 D$(23)=CHR$(9Ø):D$(24)=CHR$(
  2):D$(25)=CHR$(24):D$(26)=CH
  R$(14)                   :REM*24Ø
22 D$(27)=CHR$(Ø):TR=18:SC=DB:G
  OSUB4:PS=DE:GOSUB6       :REM*113
23 FORI=ØTO29:PRINT#2,LEFT$(D$(
  I),1);:NEXT:GOSUB5:CLOSE2:CL
  OSE15                    :REM*42
24 PRINT:PRINT"DONE!":END
                           :REM*254
25 REM DA-RUNNER HEX DATA
                           :REM*122
26 DATA Ø315BFFFFFFF8ØØØØ1BF FF
   F9AØØØØDAFFEØDA8Ø2 EDABØ2EDA
   A82ØDAA92ED             :REM*7
27 DATA AB2AEDA83AØDA82AEDA8 Ø2
   EDAFFEØDAFFEEDAFFE EDAØØØØDB
   FFFFD9FFFFD             :REM*59
28 DATA 8ØØØØ1FFFFFF83Ø5ØØØØ Ø4
   B918ØØØ452756E2Ø41 6E792Ø444
   12Ø2Ø56312E             :REM*132
29 DATA 3ØØØØØØØ4Ø4A696D2Ø43 6F
   6C6C65747465ØØØØØØ ØØØØØØØØØ
   ØØØØØØØØØØØ            :REM*29
3Ø DATA ØØØØØØØØØØØØØØØØØØØØ ØØ
   ØØØØØØØØØØØØØØØØ ØØØØØØØØØ
   ØØØØØØØØØØ              :REM*98
31 DATA ØØØØØØØØØØØØØØØ5275 6E
   2Ø616E792Ø44412Ø66 726F6D2Ø3
   32Ø64726976              :REM*46
32 DATA 65732EØD436F7Ø797269 67
   68742Ø28432928Ø3139 393Ø2C2Ø4
   A696D2Ø436F              :REM*147
33 DATA 6C6C657474652EØDØØØØ ØØ
   ØØØØØØØØØØØØØØØØØ ØØØØØØØØØ
   ØØØØØØØØØØ              :REM*97
34 DATA ØØØØØØØØØØØØØØØØØØØØ ØØ
   ØØØØØØAD8D848DF2ØD AD8D84C9Ø
   39ØØ5CE8D84              :REM*226
35 DATA DØF42Ø4CØ8AØØØ8CEBØD AD
   ØFCØC9139ØØFAD13CØ 1ØØAA9FF8
   DEBØDA53F29              :REM*95
36 DATA 8ØA88CECØDA5168D4EØE 2Ø
   8DC12ØB4C15BØØF3ØD ØØ2ØDØØ82
```

RUN it right: **C-64 or C-128, with the appropriate GEOS disks**




```
    Ø4BC1A98Ø85          :REM*9Ø
37 DATA 2FA9Ø485Ø3A96D85Ø22Ø 23
    Ø84C5BØCADF2ØD8D8D 84ADF1ØD2
    ØBØC22Ø3ØØ9          :REM*2Ø6
38 DATA 4C3EC235Ø53DØ5BC04BE Ø4
    C9Ø6CBØ6ØØØ18496E 736572742
    Ø6E65772Ø64          :REM*21
39 DATA 69736B2Ø696E746F2Ø64 72
    6976652E1BØØ184361 6E27742Ø6
    C6F61642Ø74          :REM*89
4Ø DATA 6869732Ø44412E1BØØ81 ØC
    1Ø1ØØE1Ø148ØØ12Ø 964ØØØFFØ
    Ø13BEØ6ØBØ3          :REM*145
41 DATA 17F2Ø4ØB8217Ø8Ø5ØB82 21
    E7Ø4ØB822BØ4ØE0511 3Ø1211633
    1Ø5Ø6114112          :REM*62
42 DATA 115239Ø5ØØ184F6E2Ø64 69
    736B3A1BØØ185Ø6C65 617365Ø27
    3656C656374          :REM*137
43 DATA 2Ø612Ø44413A1BØØ1828 44
    726976652Ø41291BØØ 81Ø111148Ø
    B1Ø1Ø23Ø5ØB          :REM*229
44 DATA 1Ø2Ø4Ø7FØØ184469736B 2Ø
    4572726F723A1BØØ41 Ø5ØØØØ61
    ØA2Ø698Ø5ØØ          :REM*4Ø
45 DATA ØØØ61ØA7Ø6Ø5FF82FE8Ø Ø4
    ØØ82Ø38ØØ4ØØBEØ38Ø Ø3EØØ66ØØ
    38ØØ63ØØØ6Ø          :REM*55
46 DATA Ø38ØØ6366EFØØ38ØØ636 66
    6ØØ38ØØ636666ØØ38Ø Ø636666ØØ
    38ØØ636666Ø          :REM*153
47 DATA Ø38ØØ6B6E66ØØ38ØØ3E3 E6
    38Ø38ØØØ3ØØØØØØ38Ø Ø4ØØ81Ø3Ø
    6FF817FØ5FF          :REM*121
48 DATA ØCBFØ5FF82FE8ØØ4ØØ82 Ø3
    8ØØ4ØØB8Ø38ØF8ØØCØ ØØØ38ØCCØ
    ØØØØØØ38ØC6          :REM*199
49 DATA FDD99EØ38ØC6EØD9B3Ø3 8Ø
    C6CØD9B3Ø38ØC6CØCF 3FØ38ØC6C
    ØCF3ØØ38ØCC          :REM*129
5Ø DATA CØC633Ø38ØF8CØC61EØ3 8Ø
    Ø4ØØ82Ø38ØØ4ØØ81Ø3 Ø6FF817FØ
    5FFØCFFDB8Ø           :REM*153
51 DATA ØØ8ØØØ8ØØØ8ØØØ8ØØØ8Ø Ø1
    BCØBFØØBE3CBE3C8Ø 8Ø81C1B2Ø
    Ø8CØØB362B3           :REM*215
52 DATA 6281CØ81C1BCØØ8CØØB3 6Ø
    B36Ø83EØ81C1B2ØØ8D CØBE6EBE6
    E87FØ81C1BD           :REM*Ø
53 DATA CØ836ØBØ66BØ668FF881 C1
    836Ø836ØBØ3CB03C81 CØ81C1836
    Ø81CØ81CØ8Ø           :REM*2Ø9
54 DATA CD8Ø81CØ81C181CØ8Ø3C 81
    CØ81CØ81CØ8FF98Ø7E 8Ø3687FØ8
    3EØ81CØ87F1           :REM*125
55 DATA 8Ø188Ø3C83EØ87FØ81CØ 83
    E18Ø188Ø3Ø81CØ81CØ 81CØ81C18
    Ø188Ø3Ø8Ø8Ø           :REM*114
56 DATA 81CØ81CØ8Ø818ØØØ8ØØØ 8Ø
    ØØ8ØØØ8ØØØ8ØØ1ØCFF 18638D1D8
    54CBFC2A9Ø8           :REM*97
57 DATA 4C9CØ6A9Ø74C9CØ6A912 8D
    E1Ø4AD8D84C9Ø2BØØ5 A9ØØ8DE1Ø
    46ØA9Ø92Ø39           :REM*2Ø3
58 DATA C12Ø9FC12Ø2E41ØØFEØØ A9
    Ø685Ø3A9F385Ø2A92A 85Ø5A9ØØ8
    519A9758518           :REM*46
59 DATA ADECØD1ØØ8A9Ø18519A9 ØB
    85182Ø48C14CC5Ø818 1A2Ø44412
    Ø52756E6E65           :REM*136
6Ø DATA 722Ø1BØØ1862792Ø4A69 6D
    2Ø436F6C6C65747465 1BØØ8E3BØ
    EAD3BØE85Ø4           :REM*9
61 DATA A9ØØ85Ø5A9ØØ85Ø7A9ØA 85
    Ø6A2Ø4AØØ62Ø69C1A9 188D4Ø7FA
    93A8D427FA9           :REM*16
62 DATA 498D417FAØØ3A5Ø4FØØ5 Ø9
    3Ø994Ø7FA512Ø93Ø99 4Ø7FC8A91
    B994Ø7FC8A9           :REM*25Ø
63 DATA ØØ994Ø7FA9Ø585Ø3A914 85
    Ø22Ø56C26ØADFØØD2Ø BØC2A2122
    Ø98C2AØØFB1           :REM*12
64 DATA 1299Ø4ØE881ØF8A9ØØ8D 14
    ØEAD89841869398D1Ø Ø5A915850
    FA96785ØEA9           :REM*1Ø3
65 DATA Ø5851ØA9328511A9ØØ85 17
    A9ØØ85162Ø3BC238A9 32E5118D4
    Ø7FA9158521           :REM*18
66 DATA A967852ØA9Ø485Ø3A9B8 85
    Ø22Ø56C2A5Ø2C9Ø5FØ 33C9Ø8DØØ
    568684C5BØ4           :REM*71
67 DATA C9Ø7FØØ7C9Ø6FØØ94C68 Ø7
    2Ø83Ø84C68Ø7A9Ø485 Ø3A9AF85Ø
    2A9Ø485ØFA9           :REM*222
68 DATA 7B85ØE2Ø56C22ØA1C24C 68
    Ø7ACC4Ø98884Ø6A911 85Ø4A2Ø4A
    ØØ62Ø6ØC118           :REM*194
69 DATA A5Ø4696785Ø4A5Ø56915 85
    Ø5AØ1ØB1Ø4911E881Ø F9386ØADE
    BØDFØ23A97F           :REM*74
7Ø DATA ØDECØD852ØAØØØB1Ø285 Ø4
    C8B1Ø2FØ1185Ø5C8A2 ØØA1Ø4ØDE
    CØD2528Ø1Ø4           :REM*199
71 DATA B85ØE66ØA5BA8DF1ØD8D FØ
    ØDAD8D84C9Ø1FØ25AD ØFCØC92Ø9
    Ø1EAD9Ø84FØ           :REM*186
72 DATA 1929ØF8DEFØDAD8E8429 ØF
    CDEFØDFØØ7ADC48829 4ØFØØ3EE8
    D844CE1C1AE           :REM*175
73 DATA 8D84CAFØ152Ø9FØ88DFØ ØD
    2ØBØC22ØA1C28AFØØ6 2Ø14Ø7B85
    ØEB6ØAD8D84           :REM*84
74 DATA C9Ø1FØ1B1869Ø88DEFØD AD
    FØØD1869Ø1CDEFØD9Ø Ø2A9Ø8A8B
    98684FØFØ98           :REM*56
75 DATA 6ØADFØØD6Ø2ØAC06AD4Ø 7F
    AØ114CCAØ92ØB7C11F 854FØEA1Ø
    1ADECØD3Ø21           :REM*118
76 DATA 2ØB7C1Ø08C7F11E8Ø3A9 Ø3
    85Ø3A9E885Ø2A98C85 Ø5A9Ø085Ø
    4ADØ08C85Ø6           :REM*195
77 DATA 2Ø7BC12ØB7C14Ø7FFFØF CØ
    ØØ2ØB7C14ØBFBF1ØCØ ØØ2ØA1C2A
    2122Ø98C2A9           :REM*68
78 DATA ØE85Ø5A91585Ø4A212AØ Ø4
    A91Ø2Ø68C2A9ØØ8D25 ØE6Ø2ØA1C
    2A2122Ø98C2           :REM*1ØØ
79 DATA A9ØE85Ø5A91585Ø4A212 AØ
    Ø4A91Ø2Ø6EC2FØ17AD 898418693
    98DBEØ9A9Ø9           :REM*222
8Ø DATA 85Ø3A98C85Ø22Ø56C24C 3Ø
    Ø9ADECØD3Ø0Ø92ØB7C1 7F11Ø08CE
    8Ø32ØB7C1BF           :REM*69
81 DATA 1Ø4ØBFCØØØ2ØB7C1FFØF 4Ø
    7FCØØØ2ØB7C14FØE1F 85A1Ø16Ø8
    1ØB1Ø1ØAØØ9           :REM*66
82 DATA ØB1Ø2Ø15ØEØB1Ø3ØB5Ø9 Ø1
    Ø148ØØ185Ø6C656173 652Ø696E7
    36572742Ø64           :REM*2ØØ
83 DATA 69736B3AØØ496E2Ø4472 69
    76652Ø412E1BØØØØØØ ØØØØØØØØØ
    ØØØ8CC5Ø98D           :REM*2Ø4
84 DATA C2Ø9A5218DC9Ø9A52Ø8D C8
    Ø9A9Ø22Ø39C12Ø37ØA A98385Ø6A
    99285Ø72Ø24           :REM*24Ø
85 DATA C1A9FF2Ø27C1A93B85Ø6 A9
    FF2Ø27C1ADECØD1ØØ9 E6ØAC6Ø8A
    9FF2Ø27C1AD           :REM*41
86 DATA C2Ø9C9Ø89Ø1AADECØD1Ø ØC
    2ØABC1ECØ58C838C1Ø B85ØØ92ØA
    BC1ECØ5ØC83           :REM*251
87 DATA ØC1ØA9ØB8DAA84A9A48D A9
    844C5DØBA9ØØ85Ø9A9 4385Ø8A9Ø
    Ø85ØBA9BF85           :REM*243
88 DATA ØAADECØD1Ø1ØA9ØØ85Ø9 A9
    8785Ø8A9Ø185ØBA97E 85ØAA93B8
    5Ø6A98285Ø7           :REM*125
89 DATA 6Ø85Ø2A9ØA85Ø4AØØ4A2 Ø2
    2Ø6ØC12Ø37ØAE6Ø6A5 Ø21865Ø68
    5Ø669ØA85Ø7           :REM*1Ø
9Ø DATA E6Ø8DØØ2E6Ø9A2ØA4C75 C1
    ADC2Ø9FØ78A53848A5 37482Ø37Ø
    AA5ØB8538A5           :REM*18
91 DATA ØA8537C637A9ØØ2Ø39C1 A9
    182Ø45C1A9ØØ8DC7Ø9 2Ø65ØA2Ø2
    4C1A5Ø98519           :REM*223
92 DATA A5Ø88518A5Ø6186Ø9785 Ø5
    ADC7Ø9186DC3Ø9A888 CCC2Ø9BØ2
    A842ØADC5Ø9           :REM*215
93 DATA 85Ø2A2Ø2AØ2Ø2Ø6ØC118 AD
    C8Ø965Ø285Ø2ADC9Ø9 65Ø385Ø32 ►
```

```
   Ø48C1EEC7Ø9          :REM*143
94 DATA ADC7Ø9C9Ø7DØB32Ø3FØB 68
   85376885386ØAEC3Ø9 CADØ11FØ2
   BAEC3Ø9E8AD          :REM*24
95 DATA C2Ø938EDC3Ø9C9Ø79Ø1C 8A
   482Ø3FØB688DC3Ø9CD C4Ø9BØØ81
   869Ø6CDC4Ø9          :REM*85
96 DATA BØØ38DC4Ø94C9EØB6ØAD C4
   Ø938EDC3Ø92Ø65ØA4C 2AC1ADC2Ø
   98DC4Ø938E9          :REM*46
97 DATA Ø6BØØBDØØ9A9Ø1DØØ5A9 Ø1
   8DC4Ø98DC3Ø94C8DØA ADC3Ø9C9Ø
   1FØCFC9Ø79Ø          :REM*187
98 DATA EA38E9Ø68DC3Ø98DC4Ø9 4C
   9EØBADC2Ø938E9Ø78D C7Ø9CDC3Ø
   99Ø B1ADC3Ø9         :REM*15
99 DATA 1869Ø6CDC7Ø9BØB48DC3 Ø9
   8DC4Ø92Ø8DØA4CA4ØB ADØ5853Ø4
   5ADC2Ø9FØ4Ø          :REM*1Ø6
1ØØ DATA 2Ø37ØAA98Ø85Ø72ØB3C2 C
   9ØØFØ332Ø3FØB2Ø37ØA A53C38E
   93B85Ø2A9ØØ85        :REM*199
1Ø1 DATA Ø385Ø5A9ØA85Ø4A2Ø2AØ Ø
   42Ø69C1A5Ø2186DC3Ø9 CDC2Ø99
   ØØ3ADC2Ø98DC4        :REM*37
1Ø2 DATA Ø92Ø3FØB6ØADC2Ø9C9Ø8 9
   Ø52A9Ø58DC7Ø9A98385 Ø6A9928
   5Ø7ACC7Ø9B949        :REM*57
1Ø3 DATA ØC85ØA38E9ØF85Ø8ADEC Ø
   D298Ø85Ø985ØB2ØB3C2 C9ØØFØ2
   32Ø2AC1AØØØA2        :REM*212
1Ø4 DATA 6ØADECØD1ØØ2A2CØ88DØ F
   DCADØFA2Ø2AC1ACC7Ø9 B955ØCB
   E4FØC4CD8C1CE        :REM*224
1Ø5 DATA C7Ø91ØB36ØBFAF9F8F7F 6
   FØBØBØBØBØBØB13ØB68 7F5D4CA
   9ØD851FA9F385        :REM*194
1Ø6 DATA 1E2Ø68Ø7A9ØD85ØFA9F3 8
   5ØE2ØØBC2A9848515A9 ØØ85142
   Ø29C2AD4A81C9        :REM*131
1Ø7 DATA 18DØØ5AD4981C9B9DØ16 A
   9Ø485Ø3A9AF85Ø2A9Ø4 85ØFA99
   985ØE2Ø56C24C        :REM*199
1Ø8 DATA 5BØCAØØ2B93EC29982ØD 8
   81ØF7AD4C818D41ØEAD 4B818D4
   ØØEA9ØD85Ø3A9        :REM*89
1Ø9 DATA F385Ø2A9ØE85Ø5A92785 Ø
   4A2Ø2AØØ42Ø65C2A91A 8D26ØEA
   9ØØ8D36ØEA9ØE        :REM*191
11Ø DATA 8DØ181A9268DØØ81A9ØD 8
   D4581EE4D81A9818515 A9ØØ851
   4A9ØØ85162ØED        :REM*214
111 DATA C18AFØØ34C8AØCA9ØE85 Ø
   3A92685Ø2A97F85Ø5A9 4Ø85Ø4A
   2Ø2AØØ42Ø65C2        :REM*177
112 DATA AD89848D557F2ØB7C185 Ø
   D567F43ØØ2ØB7C15FØD 45BF2ØØ
   ØA9ØD85ØFA9F3        :REM*129
113 DATA 85ØE2ØØBC28AFØØ34C8A Ø
   CAØØ2B97FØD993EC288 1ØF7AD4
   EØE8D4ØBFAD41        :REM*115
114 DATA ØE8D42BFAD4ØØE8D41BF 4
   C45BFA9848515A9ØØ85 14A9ØØ8
   D6B882Ø11C2AD        :REM*51
115 DATA 4ØBF85166C41BFA2632Ø 1
   4Ø74C5BØC4C567FØØØØ ØØ2ØB4C
   114ØØ9B84ØØA9        :REM*64
116 DATA ØØ8D7D87AD557F2ØBØC2 A
   97F85ØFA94Ø85ØE2ØØB C28AFØØ
   62Ø14Ø74C8AØC        :REM*238
117 DATA A9ØØ8D6B88A9848515A9 Ø
   Ø85142Ø11C28AFØØ62Ø 14Ø74C8
   AØC4CC8ØDAØØ2        :REM*54
118 DATA B982ØD993EC2881ØF7A9 Ø
   E85Ø3A92685Ø22Ø38C2 8AFØØ72
   Ø14Ø7ØØ4C8AØC        :REM*72
119 DATA 4C5BØ4ØØØØØ8Ø8Ø8Ø8Ø8 Ø
   2,-1                 :REM*239 ■
```

RUN's Checksum

TYPE IN *RUN*'s CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running. When typing in a program from *RUN*, first load and run *RUN*'s Checksum. The screen will display a SYS number that deactivates and reactivates the Checksum. Always disable *RUN*'s Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

With this new version, when you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line is correct. If the number that appears *doesn't* match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the SYS number. Save the finished program.

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACEs}—press the space bar 22 times

{SHIFT CLR}—hold down the shift key and press the clr-home key

{2 CRSR DNs}—press the cursor-down key twice

{CTRL 1}—hold down the control key and press the 1 key

{COMD T}—hold down the Commodore logo key and press the T key

{FUNCT 1}—press the F1 key

{5 LB.s}—press the British pound key (*not* #) five times R

Listing. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
1Ø REM RUN'S CHECKSUM 64/128 - BOB KODADEK
2Ø MO=128:SA=3328:IF PEEK(4Ø96Ø)THEN MO=64:SA=4
   9152
3Ø FOR I=ØTO169:READB:CK=CK+B:POKE SA+I,B:NEXT
4Ø IFCK<>2Ø651 THENPRINT"DATA ERROR!":END
5Ø POKESA+11Ø,24Ø:POKESA+111,38:POKESA+14Ø,234
6Ø PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
7Ø PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128
   THEN 1ØØ
8Ø POKESA+13,124:POKESA+15,165:POKESA+25,124:PO
   KESA+26,165
9Ø POKESA+39,2Ø:POKESA+41,21:POKESA+123,2Ø5:POK
   ESA+124,189
1ØØ POKESA+4,INT(SA/256):SYS SA:NEW
11Ø DATA 12Ø,162,24,16Ø,13,173,4,3,2Ø1,24,2Ø8,4
   ,162,13,16Ø,67,142,4,3,14Ø
12Ø DATA 5,3,88,96,32,13,67,152,72,169,Ø,141,Ø,
   255,133,176,133,18Ø,166,22
13Ø DATA 164,23,134,167,132,168,17Ø,189,Ø,2,24Ø
   ,58,2Ø1,48,144,7,2Ø1,58,176
14Ø DATA 3,232,2Ø8,24Ø,189,Ø,2,24Ø,42,2Ø1,32,2Ø
   8,4,164,18Ø,24Ø,31,2Ø1,34
15Ø DATA 2Ø8,6,165,18Ø,73,1,133,18Ø,23Ø,176,164
   ,176,165,167,24,125,Ø,2,133
16Ø DATA 167,165,168,1Ø5,Ø,133,168,136,2Ø8,239,
   232,2Ø8,2Ø9,169,42,32,21Ø
17Ø DATA 255,165,167,69,168,17Ø,169,Ø,32,5Ø,142
   ,169,32,32,21Ø,255,32,21Ø
18Ø DATA 255,169,13,32,21Ø,255,1Ø4,168,96,1Ø4,1
   7Ø,24,32,24Ø,255,1Ø4,168
19Ø DATA 96,56,32,24Ø,255,138,72,152,72,24,162,
   Ø,16Ø,Ø,32,24Ø,255,169
2ØØ DATA 42,2Ø8,198                              ■
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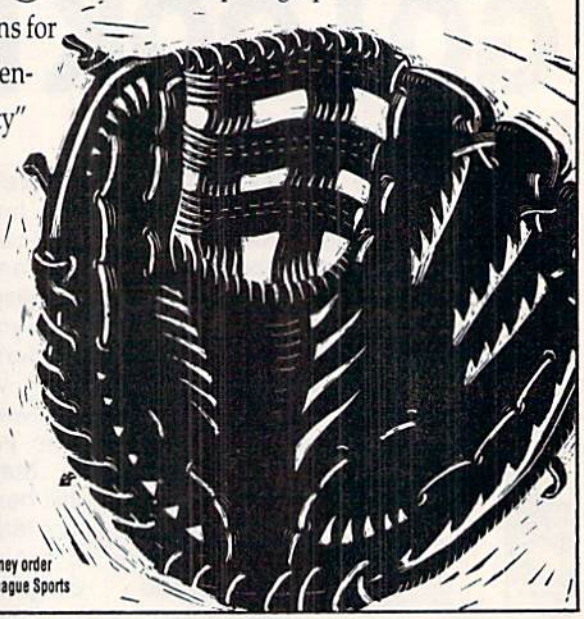

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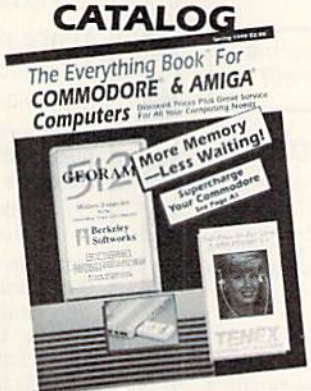

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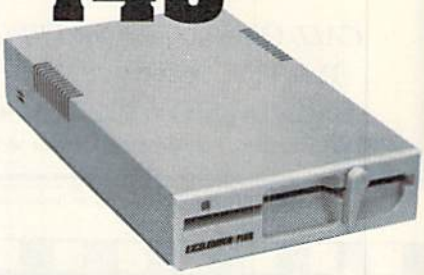

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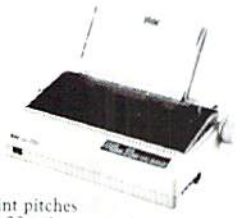

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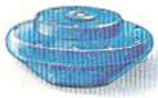

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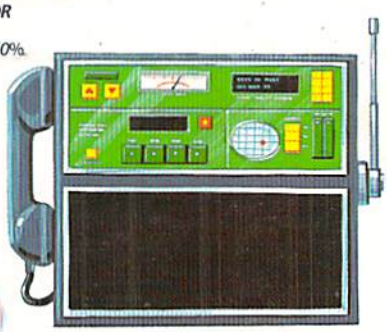

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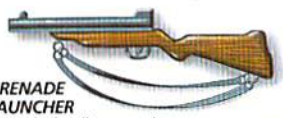

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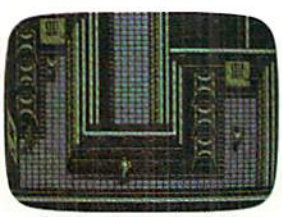

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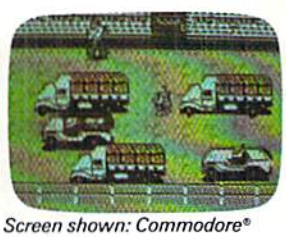

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